GAS

JANUARY, 1947

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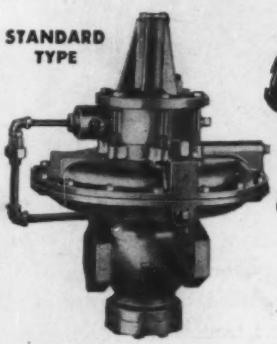
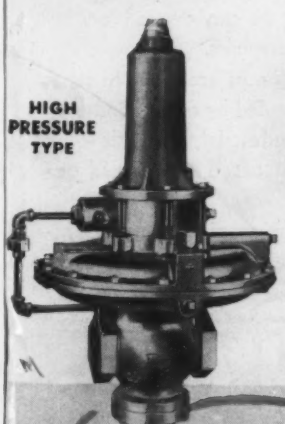


Get EMCO "1001" REGULATORS

FOR Constant INLET OR OUTLET PRESSURE CONTROL

HIGH PRESSURE TYPE



COMPACT

No other design provides so much regulator compressed into such a small space. Constructed for installation simplicity with respect to both dimensions and connections. All parts are fully accessible.

MODERN DESIGN

Unexcelled performance results from the use of a *pilot loading system* which assures movement of the operating diaphragm with the slightest change in the controlled pressure.

VERSATILE

Adaptable to practically all regulation problems met in normal gas practice. Extreme accuracy obtainable within the same assembly for outlet pressures ranging from 2 oz. to 20 psi in the *Standard Type* and from 5 to 60 psi in the *High Pressure Type;* both ranges depending upon spring setting.

LARGE CAPACITY

This unique regulator has an exceptionally high capacity. It will accurately control flow rates well in excess of those normally transmitted through 2 in. piping.

A Thousand and One Uses In The Gas Industry

ROCKWELL

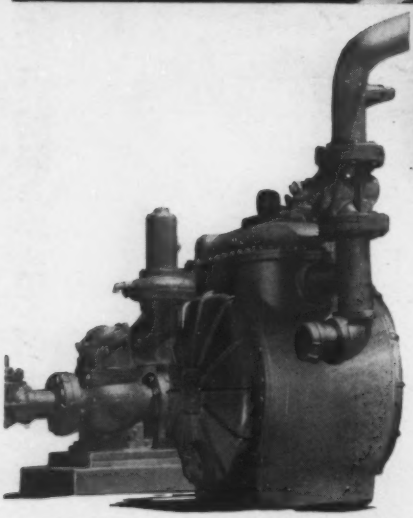
PITTSBURGH EQUITABLE METER DIVISION
Rockwell Manufacturing Company
PITTSBURGH 8, PA.

Atlanta Boston Chicago Houston
Kansas City Los Angeles New York
Pittsburgh San Francisco Seattle Tulsa

THE TREND CONTINUES TO GAS

TP700
P3

RELIANCE REGULATORS PLAY AN IMPORTANT PART IN THE VITAL BAKING INDUSTRY



American Metric Ironcase Meters and Reliance Combination Balanced Valve Regulators efficiently control gas pressure to maintain even temperature in many of our modern baking plants.

Providing an essential part of every meal for all of us, the baking industry is indeed "big business" today. In large, spotlessly clean plants, with modern methods and mass production efficiency, and through up-to-the-minute distribution, these necessities and "goodies" are brought to you ... fresh, flavorful and taken for granted ... for just a few pennies a day.

In the preparation of fine quality bakery goods, a positive control of temperature in gas fired ovens is an absolute necessity. And it is in the positive control of these temperatures that Reliance Regulators play their important part.

For over thirty-four years Reliance Engineers have worked with industry to perfect the flawless, trouble-free performance built into every Reliance Regulator —performance you can depend on regardless of requirements.

Reliance Regulators are made in types and sizes most needed by the gas industry —distribution, industrial, domestic—for natural, manufactured and liquid petroleum gas.

Reliance bulletins give complete information. Write TODAY for your copy.

AMERICAN METERS RELIANCE

AMERICAN METER CO. EST. 1836

RELIANCE REGULATORS

RELIANCE REGULATOR CORPORATION
1080 MERIDIAN AVENUE, ALHAMBRA, CALIFORNIA

"It's so dependable ...it's a Payne Floor Furnace"
Friends enjoy dropping in to a PAYNEHEATED home because it's cheerful and inviting, with fresh, spring-like warmth.
And PAYNEHEAT owners like to tell about the care-free comfort and time-tested reliability of their PAYNE gas furnaces.
The PAYNE floor furnace requires no basement...fits compactly beneath the floor with only the attractive grille showing...performs with unvarying efficiency ...is rugged, precision-built, fully vented. No fumes, no moisture condensation on walls or drapes.
Let your PAYNE dealer show you how easily and economically this finely-engineered floor furnace
GAS FUEL HAS EVERYTHING
Payneheat
OVER THIRTY YEARS OF LEADERSHIP
BEVERLY HILLS • CALIFORNIA
I've talked to a lot of owners... they all praise the Payne Duplex Furnace!
TIME: Any day. PLACE: Wherever folks get together over a friendly cup of coffee. CAST: Home owner and friend who plans to build.
OWNER: "Everybody I know who has a PAYNE gas floor furnace is sure a PAYNE Duplex and it's a honey! No work, no dirt, no trouble—just years and years of solid comfort. And our heating bills are really low. You can't go wrong on PAYNEHEAT."
The PAYNE Duplex—time-tested, rugged, advanced in construction—fits into the wall, with an attractive grille on either side and the heating unit under the floor. Needs no basement. Its quick, clean flow of warm air keeps two rooms or suites cheerfully comfortable. Fully vented, of course.
Get full particulars from your PAYNE dealer. Or write to us for "Duplex" folder.
GAS FUEL HAS EVERYTHING
Payneheat
OVER THIRTY YEARS OF LEADERSHIP
PAYNE FURNACE COMPANY, BEVERLY HILLS, CALIFORNIA
One of the DRESSER Industries

YOUR SILENT SALESMEN

"Payneheat" Launches Campaign of Color Ads in Magazines

For a third of a century, PAYNE has aggressively promoted gas fuel along with its own quality furnaces, exclusively gas-fired. Now again in 1947 we continue our consistent advertising in support of utilities, distributors and dealers, spearheaded by a strikingly colorful magazine campaign. Reproductions of typical new PAYNE color-ads are shown above.

★ It is our hope that conditions during 1947 will favor the increased production which could well make this the gas industry's greatest year!

GAS FUEL HAS EVERYTHING

Payneheat

OVER THIRTY YEARS OF LEADERSHIP

PAYNE FURNACE COMPANY
(One of the DRESSER Industries)
BEVERLY HILLS, CALIFORNIA

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GAS

REG. U. S. PATENT OFFICE

Twenty-Third Year of Publication

CCA

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THERMAC

HM

Appliance REGULATORS

...For Natural and Manufactured Gas
...Butane-Air

DESIGNED FOR LONG TROUBLE-FREE SERVICE

This regulator is constructed of aluminum alloy for light weight and strength. Bosses around the pipe connections are heavy and strong to withstand extra tightness on the threads. Flanges are thick—you can drop an HM Regulator without bending or breaking and without affecting its performance or causing leakage.

Internally too, it's just as rugged—designed for much more than ordinary abuse. All parts are corrosion resistant. You can install an HM Regulator and forget it—it will function long and faithfully. That is why many leading appliance builders choose Thermac.

Order Now!
...for early delivery

CHECK THESE 10 MAIN FEATURES

▶ High Capacity—Close Control ▶ Low Maintenance ▶ All Aluminum, Light Weight, Rugged ▶ Max. Inlet Pressure 15" WC; Max. Outlet Pressure 5" WC ▶ Parts Corrosion Resistant ▶ Inspect without removal from line ▶ Factory Tested and Sealed to Your Specifications ▶ Certified by A.G.A. ▶ Millions in use ▶ Sizes: from ⅜" to 2½ IPS.

THERMAC
COMPANY
800 East 108th Street
Los Angeles 2, Calif.

RESOLUTION FOR 1947...

A resolution for the New Year well worth adopting is to *standardize on Standardized* Mechanical Joint Cast Iron Pipe for new mains. A large number of important gas utilities have already taken such action for the following reasons:

FIRST: Standardized Mechanical Joint Cast Iron Pipe means bottle-tight, long-lived mains.

SECOND: It can be easily and quickly installed by men without previous experience with the joint.

THIRD: More lengths can be laid per day with a minimum of equipment and small crews.

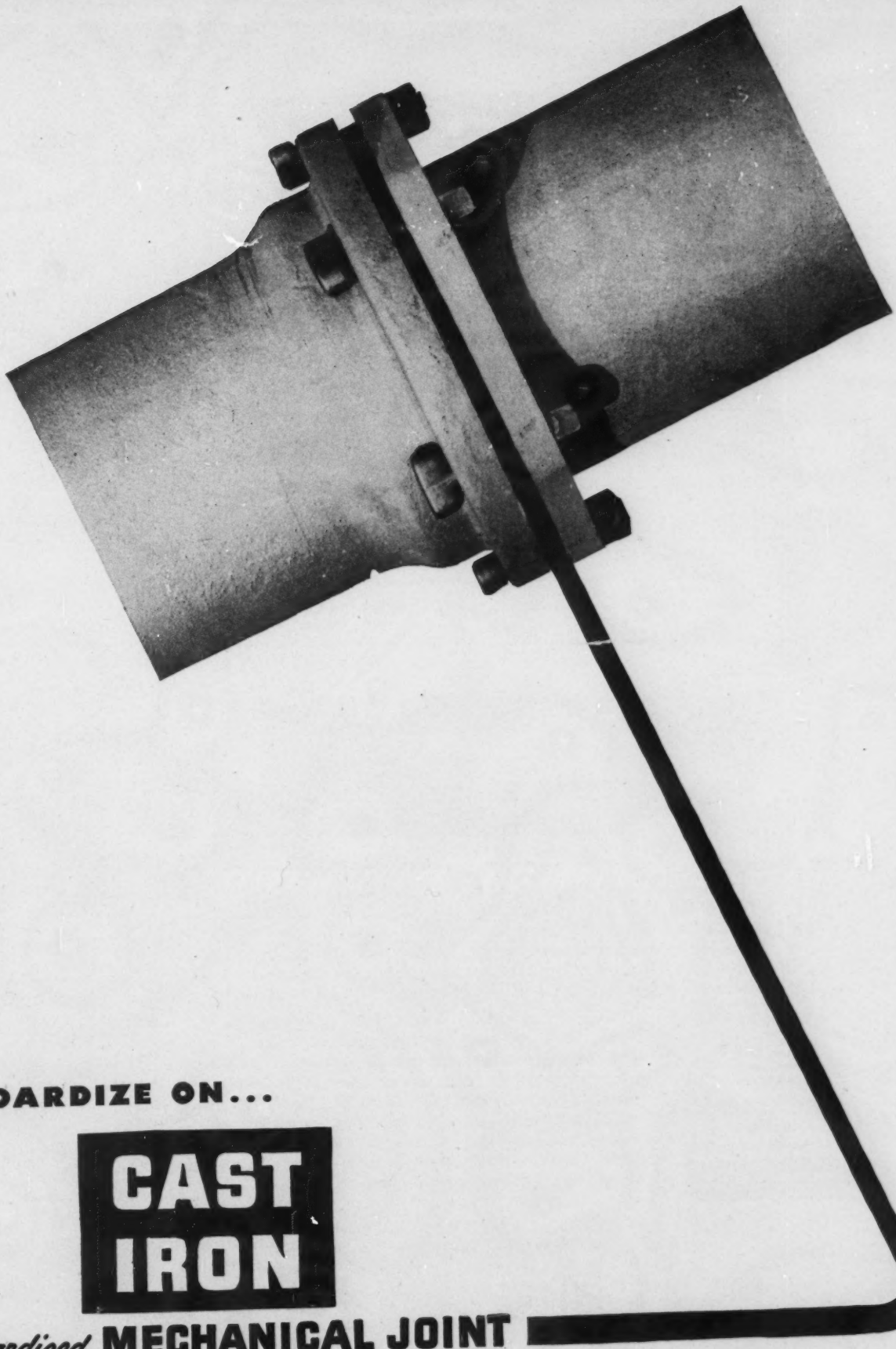
FOURTH: Less delays in wet weather and less difficulty in a wet trench.

FIFTH: All fittings and accessories are standardized and interchangeable with those furnished by other makers of mechanical joint cast iron pipe.

So, along with best wishes for the New Year, may we again suggest that you . . . . . .

Cast Iron Pipe Research Association, Thos. F. Wolfe, Research Engineer, Peoples Gas Bldg., Chicago 3, Ill.

Nearly a century before mechanical joint pipe was developed, this 10-inch cast iron bell-and-spigot pipe was laid in Baltimore 113 years ago. When uncovered for inspection after a century of service it was in excellent condition. It is America's oldest gas main.



STANDARDIZE ON...

CAST IRON

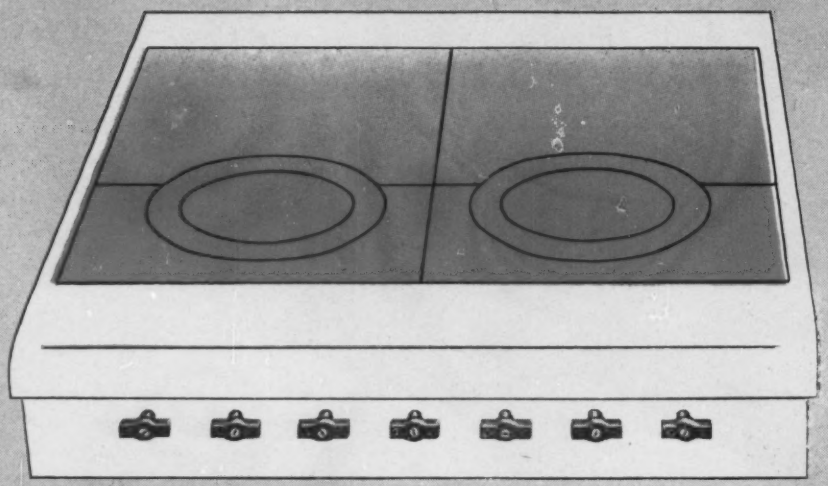
Standardized **MECHANICAL JOINT**

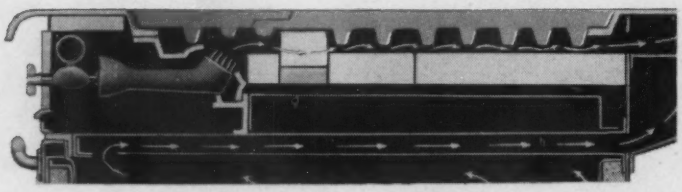
PIPE

UNMATCHED

Flexibility of Control on the Hot Top is Yours—

when You Choose the LEADER





Cross Section—Front to Back View

The Garland All Hot Top Range has the features to deliver *any* heat the chef wants—*where* he wants it—*when* he wants it. Each of the seven burners which heat the Hot Top are individually controlled. By adjustment, the chef can vary the heat on different sections of the Hot Top to exactly suit his needs.

But this is only one way Garland makes it easier to cook more food, *better!* Everywhere throughout the range, there are features, engineered by men who know volume cooking requirements; important refinements which always identify the *leader!* For greatest value, *choose the leader!* See your Garland dealer—or write us for information on any type of equipment you may need.

GARLAND
All Hot Top Range No. 45-28 CX

GARLAND

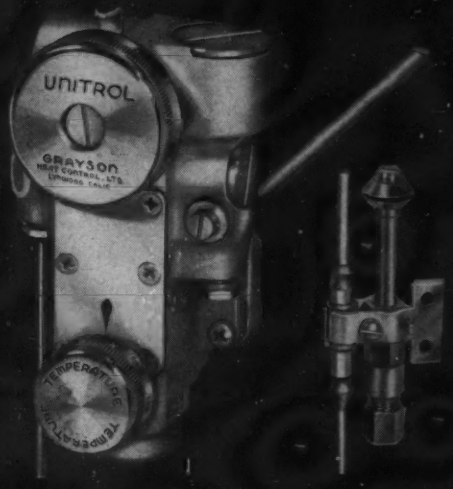
THE TREND IS TO GAS

FOR ALL COMMERCIAL COOKING

HEAVY DUTY RANGES • RESTAURANT RANGES • BROILERS • DEEP FAT FRYERS • TOASTERS
ROASTING OVENS • GRIDDLES • ALL TYPES OF COMMERCIAL COOKING EQUIPMENT

Products of Detroit-Michigan Stove Co., Detroit 31, Michigan

NEW GRAYSON UNITROL 'A'



advanced features..... 5

Constant working type

safety closure valve

assures positive shut-off

GRAYSON

HEAT CONTROL, LTD.

LYNWOOD CALIFORNIA

COMPANION
House & G
OVER 16,000,000 FAMILIES
ABOUT THE NEW SERVEL
True
POST
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Better Homes
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A MONTH WILL READ
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We're Getting Ready for War in Alaska
True Story
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When Experience Counts

You Can Rely On

UNIVERSAL

GAS RANGES

Cribben & Sexton's Seventy-five years of experience have given this organization the know-how to produce ranges of proven acceptance and dependability.

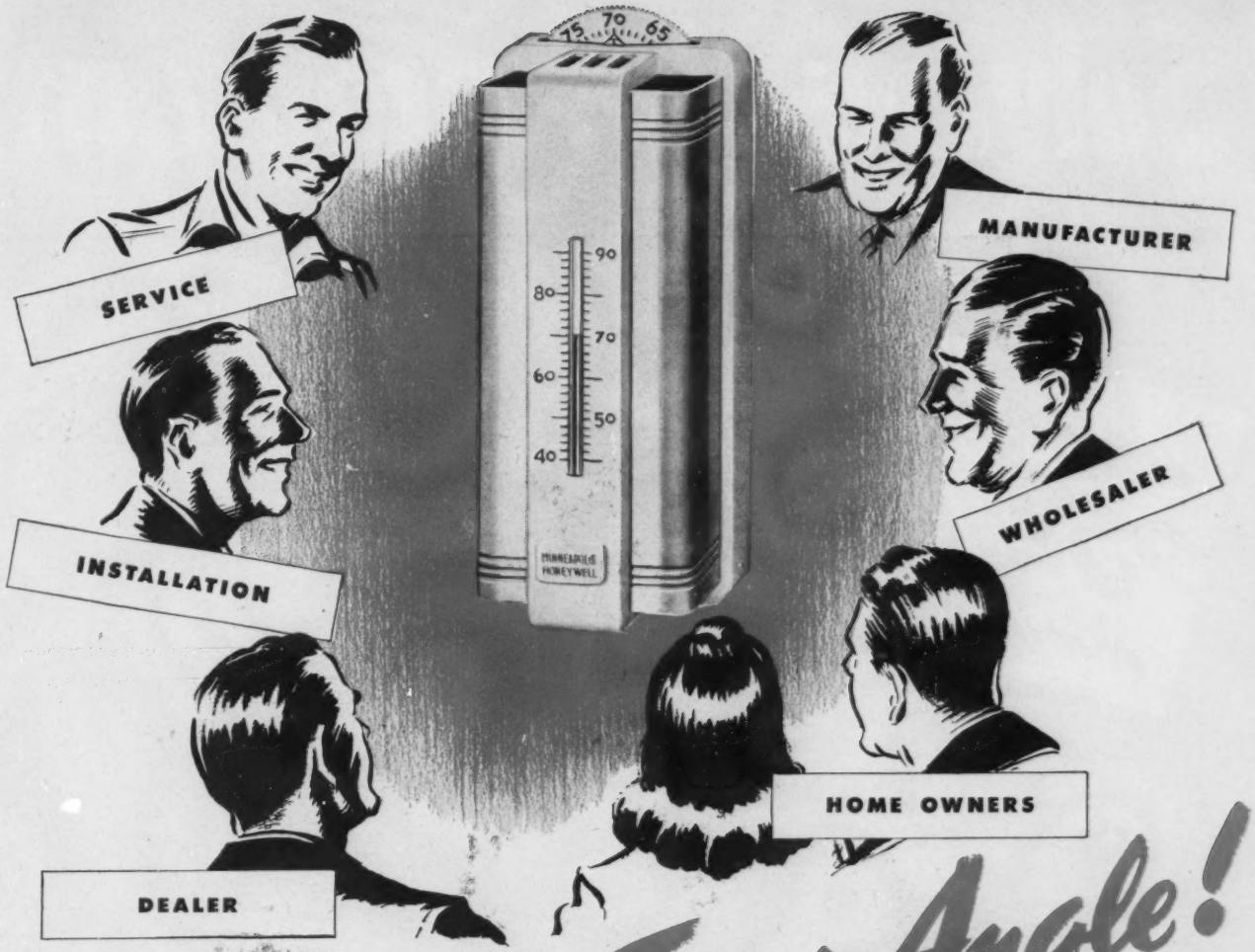
Always ahead of the field, today's Cribben & Sexton UNIVERSAL GAS RANGE bears out this proud tradition. Smooth, streamlined looks . . . sales-winning performance, backed by a complete promotional package—these make it the "Universal Choice" to get your share of this growing market!

GAS
The Preferred Cooking Fuel

UNIVERSAL
The Preferred Gas Range

1947
Still the UNIVERSAL Selection of Cooking Perfection

CRIBBEN & SEXTON
UNIVERSAL *Gas* RANGE
700 N. SACRAMENTO BLVD. CHICAGO 12, ILLINOIS



Good from Every Angle!

From factory to consumer, it's a long trip for any product. Right down the line, the wholesaler, the dealer, and all others pass stern judgment. So when a product like the Honeywell Acratherm receives such overwhelming acceptance from every segment of the gas heating industry, you *know* it is good—from every angle.

No matter how you look at it, you'll find the Acratherm brings you definite advantages. Manufacturers of gas heating equipment have found the Acratherm permits their products to function at their best. Dealers appreciate the Acratherm's reputation for ease of installation, as well as its outstanding performance, which has been established by experience on the job. *Dependable controls cost less than service,* a fact dealers understand, and this is another sales advantage for Acratherm-equipped gas heating units. Wholesalers and dealers recognize that consistent advertising means home owner acceptance—and Honeywell controls are nationally advertised products.

Minneapolis-Honeywell Regulator Company, 2641 Fourth Ave. So., Minneapolis 8, Minn; Canadian Plant: Toronto. Branches and distributing offices in all principal cities.

MINNEAPOLIS
Honeywell
CONTROL SYSTEMS

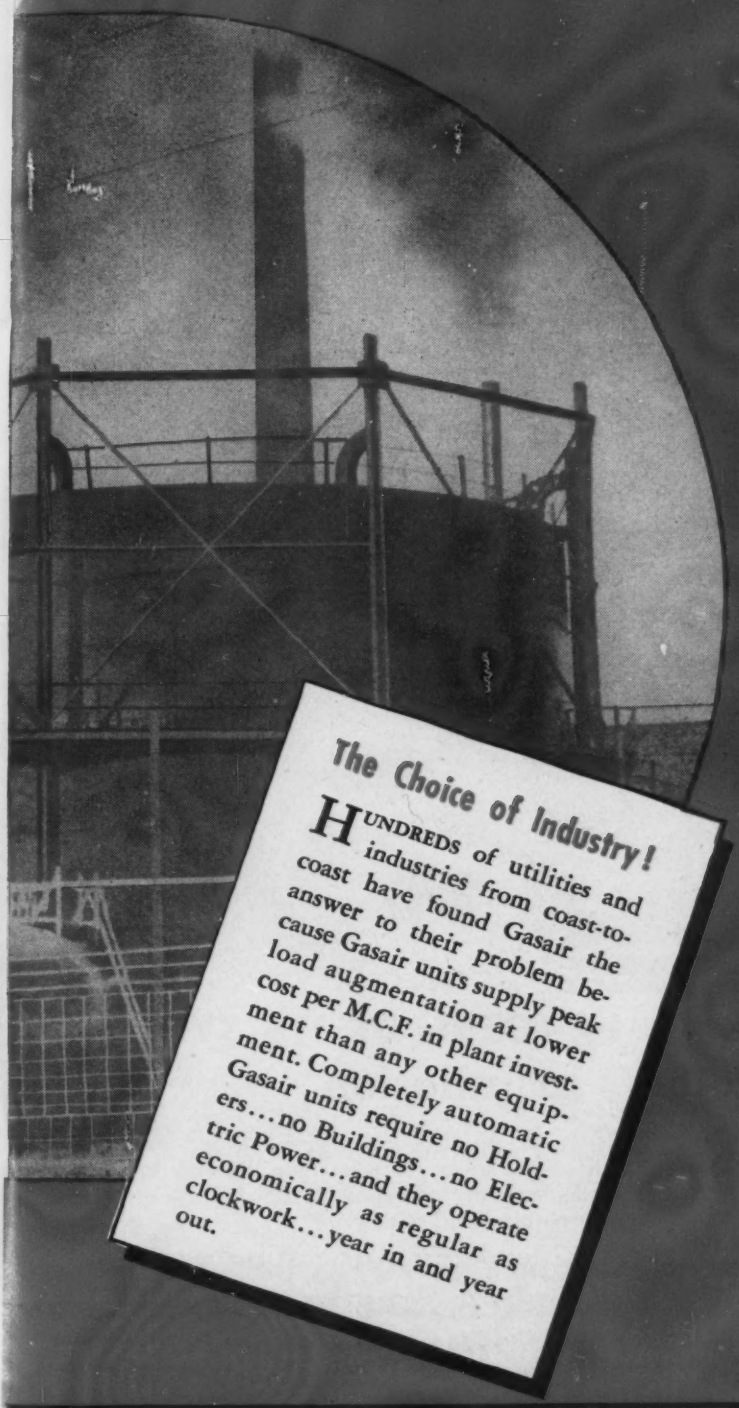
Solving the problem

Gasair packaged gasplants can solve your problem whether it's standby . . . peak shaving or 100% operation. Our engineers, trained men and special equipment are ready to serve you. Call or write your nearest Pacific Gas office for a complete analysis today.

Pacific Gas

SPECIALISTS IN LIQUID PETROLEUM GAS • MARKETING • ENGINEERING • UTILIZATION

of the GAS ENGINEER



The Choice of Industry!

HUNDREDS of utilities and industries from coast-to-coast have found Gasair the answer to their problem because Gasair units supply peak load augmentation at lower cost per M.C.F. in plant investment than any other equipment. Completely automatic Gasair units require no Holders... no Buildings... no Electric Power... and they operate economically as regular as clockwork... year in and year out.

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NEW YORK: New York City
Malone
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NORTH CAROLINA: Asheville
NORTH DAKOTA: Jamestown
OKLAHOMA: Tulsa
OREGON: Portland
SOUTH CAROLINA: Charleston
SOUTH DAKOTA: Watertown
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OVER 500 INSTALLATIONS IN THE UNITED STATES

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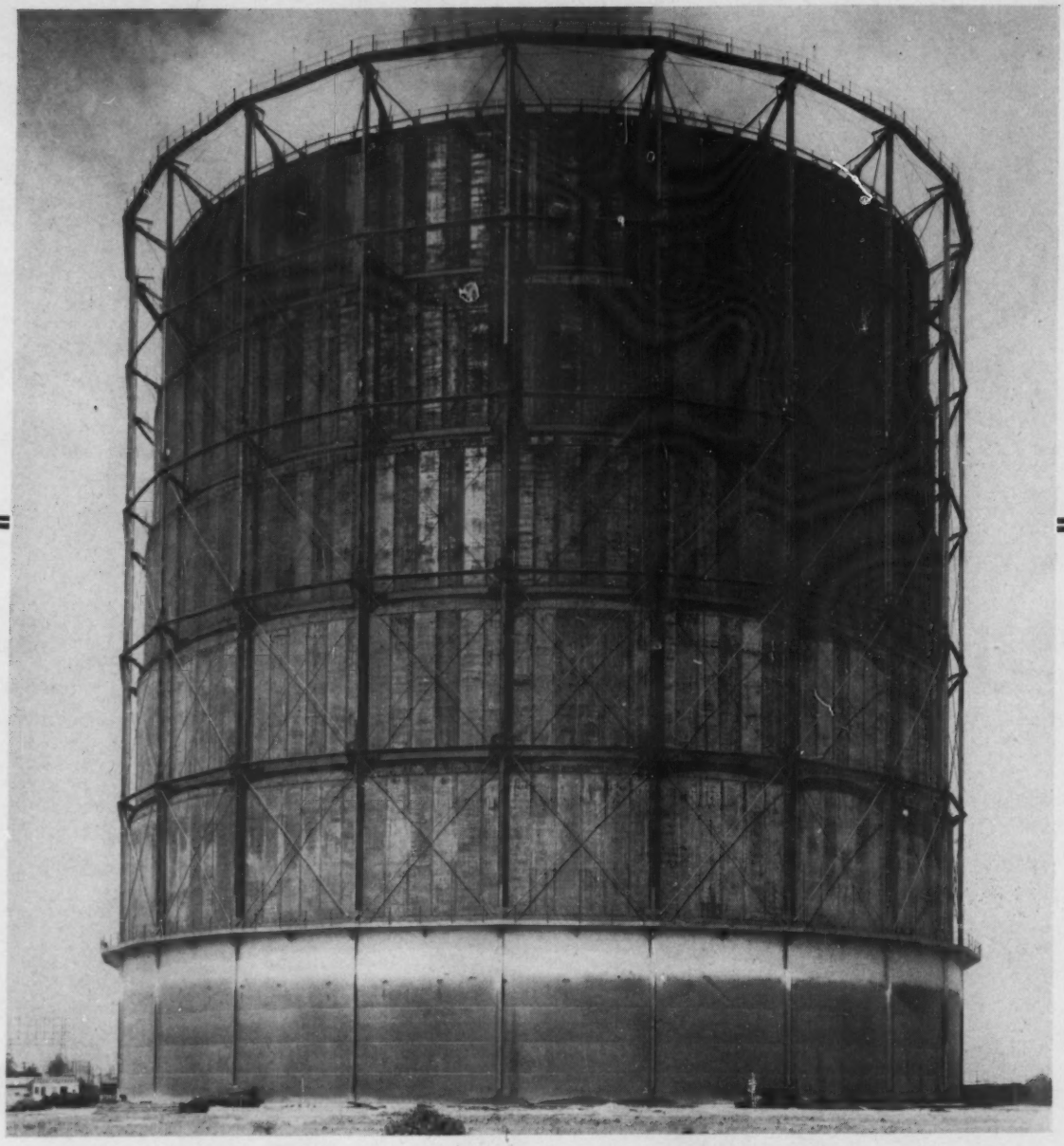

AT LONG BEACH . . . . LARGEST OF ITS TYPE
A Stacey Brothers Installation

Here's a 5,000,000 cu. ft. Wet Seal Holder —*the largest All-Welded Panel Type installation in the United States!*

This is the third Stacey Brothers holder for the City of Long Beach—another important endorsement of the famous Stacey Brothers patented design.

All-Welded Panel construction saves on original investment, on erection time—*and on maintenance expense.*

You may never need capacity as large as this Long Beach installation—but our experience in the design, fabrication and erection of wet seal holders covers every size from 100 cu. ft. up. This experience can be valuable to you when you want long life and dependable holder operation. May we talk over your requirements with you?

STACEY BROTHERS
GAS CONSTRUCTION CO.
One of The Dresser Industries
5535 Vine St. Cincinnati 16, Ohio

Stacey Brothers TANKS

Presenting the GORDON BYDAND spreader-flame— complete line of conversion burners

WE want you to examine for yourself the exclusive features of the Gordon spreader-flame burners. They speak more eloquently for themselves than we can, so we designed an exhibit of action panels:

1. See the Gordon spreader-flame principle in action.
2. Examine the telescoping venturi mixer.
3. Look at the rugged, simple, quick-acting pilot with its push-button lighter.
4. Note the iris orifice—75 orifices in one.

This way you will get fuller appreciation of the Gordon engineering excellence. We look forward to meeting old friends and making new ones at Booths 759 and 761.

GAS

ROBERTS-GORDON APPLIANCE CORP., 137 ARTHUR ST., BUFFALO 7, N. Y.

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AUTOMATICALLY YOURS!

AUTOMATICALLY YOURS!

REFRESHING NEW DESIGNS

Inspiringly conceived, skillfully planned, the new 1947 Roper models are distinctively beautiful. Put them on your display floor and listen to the reaction.

AUTOMATICALLY YOURS!

EXCLUSIVE NEW FEATURES

Big "3-in-1" ovens . . . "Staggered" cooking tops . . . "Glo" broilers . . . "Scientific" cooking charts . . . "Simmer-Speed" top burners. These "Jeweled" features will "click".

AUTOMATICALLY YOURS!

UNEXCELLED PERFORMANCE

Cooking results without a peer. Cooking ease that makes meal preparation loads of fun. Roper performance will earn a warm spot in the heart of every housewife. That's for sure.

AUTOMATICALLY YOURS!

EXTRA CONSUMER APPEAL

Roper's beauty . . . features . . . performance . . . economy . . . reputation . . . all add up to the most desirable range in America—a range that is saleable and profitable.

ROPER GAS RANGES

BUILT TO CP STANDARDS

TRADE MARK - C.G.A.A.

BRILLIANT NEW ROPER GAS RANGES FOR 1947 FEATURING JEWELS OF COOKING PERFORMANCE

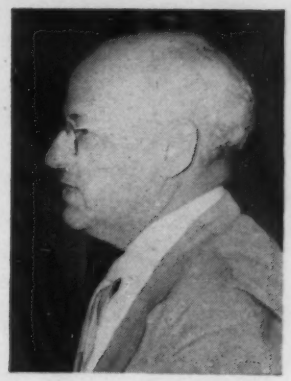
If you have not yet received the 1947 Roper Catalogs and complete promotional plans, write us about them today. Here is a top line of merchandise, backed by more than 60 years of manufacturing "know how".

GEO. D. ROPER CORPORATION, ROCKFORD, ILL.
Offices in Principal Distribution Centers

HER FOODS COOK WHILE SHE'S AWAY . . . IT'S AUTOMATIC!

THERMALLY THINKING

By ELLIOTT TAYLOR, Editorial Director



Good Old John

OLD JOHN L. has probably done more for the cause of natural gas extension in the last thirty days than the natural gas industry unaided would have been able to do for itself in the next thirty months; for old John L. started gas flowing through the Big and Little Inch pipe lines, sure enough. Clear through and into Pennsylvania and without any argument.

Of course Tennessee Gas and Transmission had an interim offer in to operate the lines during the period that was expected to elapse between the government's sale and actual delivery of the properties to the successful bidder; but whether or not they would have been given the nod was problematical. Certainly the same political influences that had tried to steer the lines into an uneconomical oil operation would have utilized every resource at their command to block their use as gas carriers through the winter fuel crisis. Even the gas crisis was a gift, you might say, from good old John L. to society; for his coal strike earlier this year shut off steel production and no steel meant no pipe and no pipe meant that T.G.T. was a season behind in its construction program originally planned to have additional gas ready for the Midwestern and Appalachian markets.

Morning's Work

The speed with which Secretary of the Interior Krug was able to clear the lines for gas once he went into action could certainly never have been duplicated by any commercial interest, regardless of how imperative may have been the demand. All in one Monday morning—Dec. 2—Cap Krug sent out letters to the War Assets Administration advising them of the necessity for immediate clearance of the lines for emergency use, and to the Federal Power Commission asking them, we will say, to issue a certificate for the interim period of operation through April 30, 1947.

WAA came through with its approval in a matter of hours, and the next day the FPC followed suit with an order approving the application of T.G.T. to operate. Gas out of Louisiana started flowing through the Little Inch Line on Thursday, Dec. 5, and the Texas supply was turned into the big line four days later, on Dec. 9.

It would be only logical to contend that since gas was badly needed in the eastern area contiguous to the lines, it would have been running through by now anyhow, coal strike or no coal strike. But history has demonstrated that the logic of a problem trails along a poor second when it has to fight it out on even terms with political expediency. And it has been political expediency, not logic, that has kept gas out of the lines up until Dec. 5.

Had there been no coal strike, and had there been no dramatization of the impending disaster that such a mid-winter strike foretold, the use of the lines would still be in the realm of political manipulation. It is our opinion that T.G.T. would still be trying to get a hearing on its interim application; and WAA would still be waiting for bids from prospective buyers of the lines. The FPC would be gravely pondering the political consequences of issuing a certificate without giving the coal intervenors an opportunity to sabotage the application; and Pennsylvania politicians would still be loudly declaring that not a foot of Texas gas would be allowed to cross the line into that embattled commonwealth. In short, everything would have been at a stalemate just as it has been since the use of the lines first fell under the baleful eyes of the Symington experts.

Memorial

But Old John L. stepped in and, with one deft wave of his magic cane, fixed everything up right. In his subtle and delicate way he has sunk his pick right into the boundless reservoir of natural gas, and has started it flowing right through and into and over the terrain that has been his own private preserve for years.

When the lines are finally awarded to a gas bidder, and when other and bigger ones are eventually put into service paralleling them—then would be the time for the natural gas industry to give some thought to a permanent memorial to the man who made all of this possible. A small eternal flame, perhaps, burning in a quiet little shrine at the mouth of an abandoned mine in West Virginia or Pennsylvania. There would be something that gas men could really view with gratitude and with reverence.

Olds' Soul

LELAND OLDS' decision to give up the post of chairman of the Federal Power Commission is one that we believe displays an admirable grasp of political realism together with a measure of dignified self-sacrifice that has been too often missing when some of the former feeders from the Old Messiah's hand have had to be nudged away from their favorite positions at the public trough.

Olds had enough sense to realize and enough character to admit that his usefulness as FPC chairman had come to an end. The commission had already experienced trouble in getting its appropriations through the last Congress, one that was generally tolerant of the Olds viewpoint. For it to be able to carry the left-wing weight of Chairman Olds before a new legislature dominated by what, to put it mildly, can be anticipated as anti-New Deal sentiment, would be asking much too much.

Those who were close to him have always maintained that Olds was a tireless worker and an extremely brilliant man. But so was old Leon Trotsky, to draw a parallel that the ex-chairman can readily understand. Had Olds elected to use his brilliance in an attempt to raise both the gas and electric industries, over which his commission had so much power, to their maximum of usefulness to the body politic, his political passing might be the occasion for some passing regret.

Why Not?

But he remained forever preoccupied with the punitive possibilities of his position, and in that, we believe, there was revealed not the measure of his greatness, but rather the mark of his limitations.

The election to the chairmanship of Commissioner Nelson Lee Smith, a man of more moderate, although by no means right-wing, views may properly be regarded by Congress as an FPC gesture, at least, in the direction of the new political realities brought about by the fall election. As far as the natural gas industry is concerned, it is only fair to record that during the Docket G-580 hearings Commissioner Smith, who was seldom absent from the bench during the many months of questioning, brought to the proceedings an open-minded attitude that appeared to reflect an increasing understanding of the gas industry's viewpoint as the investigation developed.

Although the new chairman cannot by any wild stretch of the imagination be regarded as an industry man, he at least is not an avowed inquistor and that for the moment is about all the relief that the industry can hope for. The change is all for the best; and may the spirit of the Great Departed One not haunt us for having felt obliged to say so.

And in the deeper recesses of the Olds soul there must glow this burning question: Why not resign from the commission entirely?

Indeed; why not?

Local Problems

THERE are two ways of looking at the December conference called in Washington by the Department of Labor's Conciliation Service to bring utility labor and management together for the ostensible purpose of laying the groundwork for either procedure or policy that would prevent strikes in the gas, electric, and transit industries.

The first view that occurs to any hard-bitten observer who has had an eye on Washington for some time is that the Conciliation Service is trying to set up a pattern whereby it can inject its services, wanted or unwanted, into local labor disputes in the utilities industries. Bearing out this viewpoint is the complaint of the Conciliation Service that its effectiveness is handicapped by a reluctance on the part of management to call in its experienced conciliators.

On the other hand, the fact that the labor-management committee, which acts in an advisory capacity to the Conciliation Service, favored the conference is at least evidence that some possible advantage to labor relations in the utility industries might have been anticipated.

The Labor Department is understandably apprehensive right now lest the anti-strike legislation that is expected to be introduced into the new Congress early in its deliberations will have written into it some strong prohibitions against strikes in the public utilities.

If it is true, as has been reported, that the Department of Labor is opposed to having the utilities singled out for special legislative treatment, then as far as the gas industry is concerned, we share the Department's views. Compulsory arbitration is a two-edged sword, and neither labor nor management can safely invoke its protection unless both are prepared to feel its slash when a decision goes to the opposing side.

On general principles we object to the gas industry's letting itself get drawn into a national arbitration, conciliation or any other kind of a front that attempts to impose a blanket ideology over it and the electric and transit utilities.

Labor relations in the gas industry have been in the past, and we believe can well remain, a thing apart. There are several reasons for this view. One is the excellent record of many years in which strikes in the gas industry have remained almost non-existent. It is not a record on no strikes through the exploitation of the workers. This was evidenced by the loyalty with which gas industry employees stuck to their jobs when the fantastic wages of the shipyards and the munitions plants might have lured them off into greener fields of transient financial gain. Nor is the no-strike record of the industry rooted in an anti-union policy on the part of any representative gas utilities. Organization in gas employee ranks has been constantly growing during the past 15 years, and many local unions are currently affiliated with the AFL, with the CIO, or with United Mine Workers.

Good Sense?

While the leftists still in Washington would probably sneer at the naivete of the suggestion, we believe that the reason for these relations are deeply rooted in the good sense and the tempered judgment of both employers and employees in the gas industry. These are relations that are essentially local in character, the outgrowth of a traditional willingness of each side to examine conditions and the problems as they arise in any plant or in any locality, and to work them out to a mutually satisfactory solution. Such relations do not lend themselves to the brawling, arrogant negotiations, to the atmosphere, the charge and counter charge, and to the grim defiance by both management and labor that so often characterizes the frays into which the national government is called as a referee.

The policy of centralization of all power in Washington, the lingering belief that in some way a master formula can be set up to which all problems in human, economic and political relations can be referred, is daily becoming more completely and thoroughly discredited.

Just as we believe that the dissolution of the holding companies, and the return of management and control to local ownership and local executives was a good thing for the gas industry, so also we believe that any movement aimed at taking the vital human relations out of local hands, and laying them on the laps of the omniscient ones in Washington would be a bad thing.

Rather than complain because its services are not used enough, the Conciliation Service should in all conscience congratulate management and labor in the gas industry that they have gotten along so well, so far, without those services. That is one department in Washington where no news is always good news, particularly to the consuming public.

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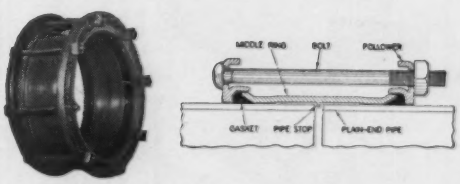

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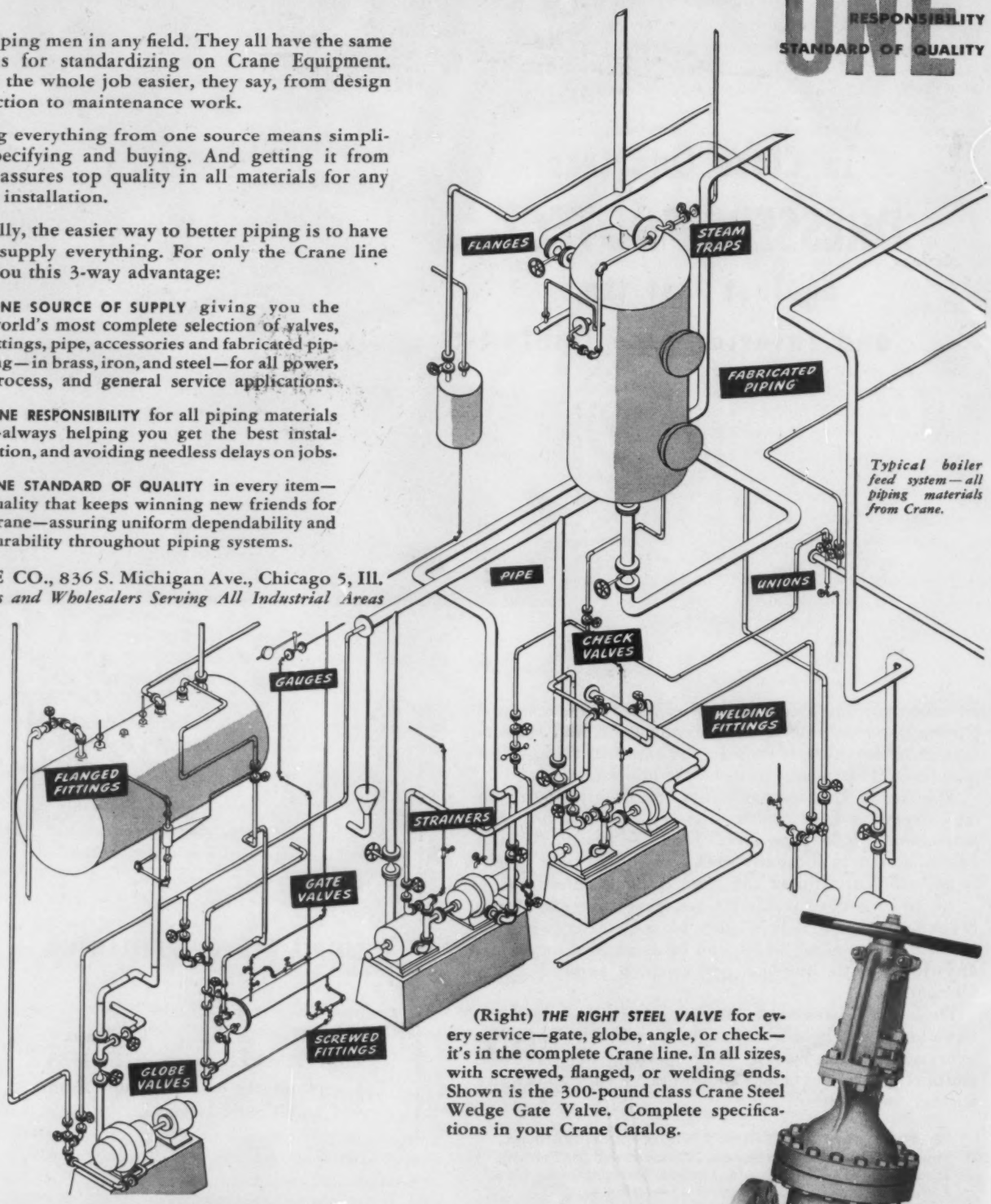

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Highlights

• The American Gas Association Combined Industrial Gas Exhibit at the National Metal Congress and Exposition held in Atlantic City Nov. 18 to 22 was the largest and one of the most attractive exhibits at the metal industry's annual event. More than forty-two thousand visitors to the exposition showed an active interest in the exhibits.

• Utilization of 900 MMcf of residue gas produced with oil will be accomplished as the result of a program under way in Texas. Sixty-nine separate projects, costing $127 million, will reduce total of flared casinghead gas from 57% of total daily production of 2486 MMcf to 18.4%. Flaring will drop from 1426 MMcf to 514 MMcf of residue gas. Nine of the projects have been completed, 16 are under construction, and 44 are planned. Majority of those completed are in South Texas or on Texas Gulf Coast.

• The State Corporation Commission for the first time has established a fixed price for Oklahoma natural gas. The commission set a price of 7 cents per Mcf at the wellhead in the big Guymon-Hugoton field. The field average has been 4 cents a thousand. Reford Bond, chairman of the commission, said taking of gas from the field at less "than 7 cents per Mcf at a pressure of 14.65 lbs. constitutes both economic and physical waste of a natural resource." The commission never before had established a fixed field price for oil or gas.

• Completion of the $84 million natural gas pipe line between Texas and Michigan and Wisconsin will mean that Detroit will be supplied with three times as much gas as will be sold this year, William G. Woolfolk, chairman of Michigan Consolidated Gas Co., reported. The project, as approved by the Federal Power Commission, is scheduled for completion in 1949 by the Michigan-Wisconsin Pipe Line Co. and will serve Milwaukee, the Fox River Valley to Green Bay, the lake shore, Madison, Janesville, Oshkosh, and Beloit in Wisconsin as well as the Detroit area.

• Six essential elements of a national oil policy are outlined in the final report of the Petroleum Administration for War made before the House Committee on Foreign and Interstate Commerce, Ralph K. Davies, Acting Director of the Oil and Gas Division and former head of the PAW, announced recently. The essentials: developing domestic supplies, maintaining a vigorous domestic industry, conserving domestic resources, exploring more areas, developing synthetic liquid fuels, and obtaining access to foreign oil supplies.

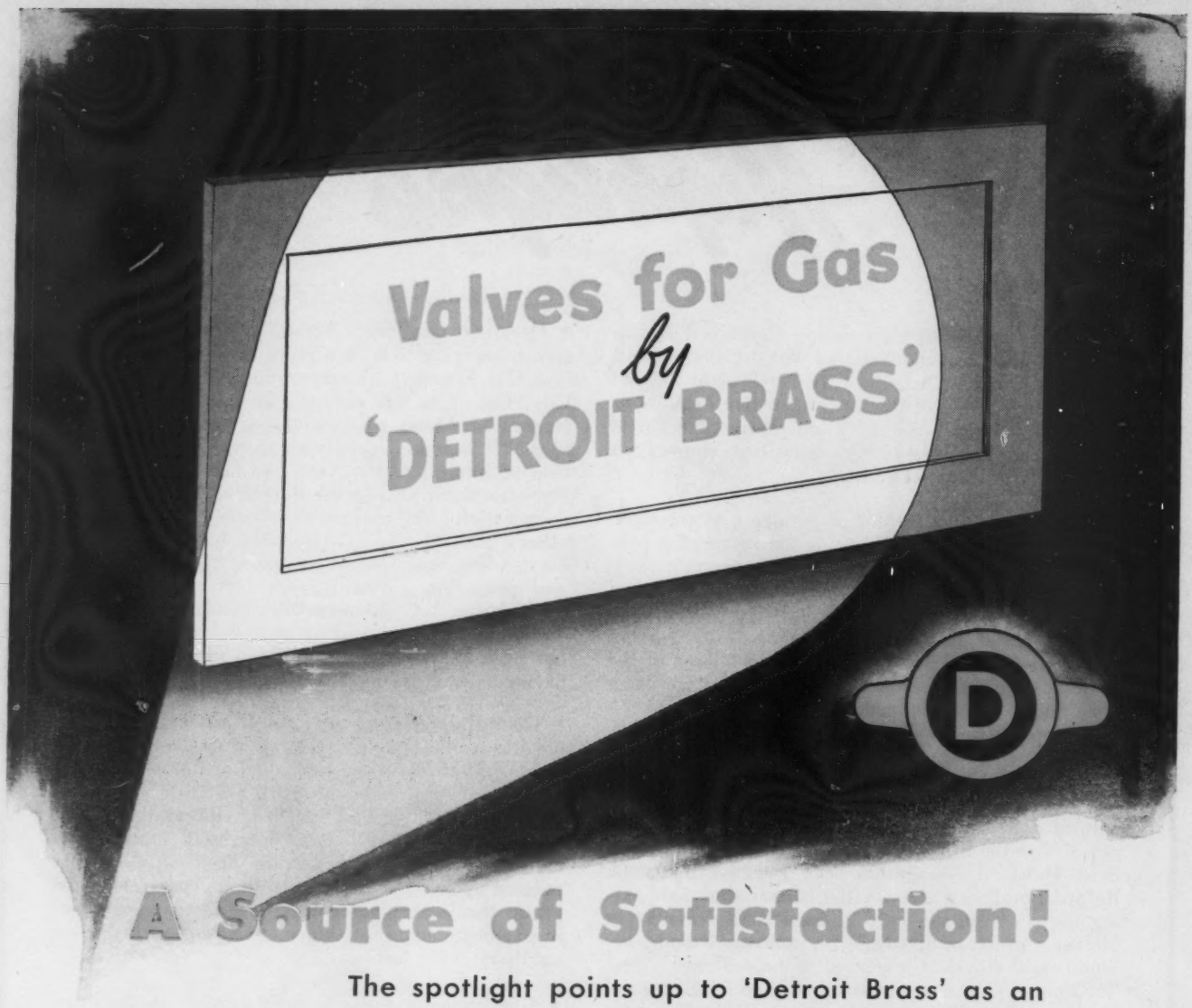
• Oscar L. Chapman, Acting Secretary of the Interior, replying to a resolution passed at the American Gas Association's annual convention in Atlantic City, Oct. 7 to 11, calling for resumption by the Bureau of Mines of natural gas technical studies, said: "It is indeed gratifying to receive this expression of interest of the American Gas Association in the work performed by the Bureau of Mines. The fine cooperation of oil and gas companies, the A.G.A. and other organizations in the industry, has made possible outstanding achievements in producing, transporting and providing means for the better utilization of natural gas. May this fine work continue with acceleration toward the goal of pure conservation which has been expressed as a wise and more efficient use of our natural gas resources."

• Operating revenues of natural gas companies reporting to the Federal Power Commission amounted to $418,310,526 for the first nine months of 1946, an increase of 4.1% over the $401,801,540 reported for the comparable period in 1945. Operating revenue deductions were up 3.1%, decreased accruals for taxes and depreciation having been offset by increased operating expenses. In the operating expense group the largest percentage-wise increase occurred in payments made for salaries and wages which were up 13.5% over last year.

• Gas range manufacturers' production facilities have been increased more than 100% over pre-war capacity. Despite this increased capacity, it will be some time before the industry can meet consumer demands. The indications are that 1947 range production may not exceed 1941 figures due to the fact that manufacturers, in general, cannot expect to obtain more steel in 1947 than they received in 1941, according to a Gas Appliance Manufacturers Association year-end statement.

• The Federal Power Commission announced that, at its meeting on Dec. 17, Leland Olds asked to be relieved of the chairmanship, a responsibility which he has had almost continuously for the past 7 years.

• Milwaukee's formal request for natural gas, a legal requirement for introduction of it there, moved nearer to reality when the common council's utilities committee voted 3-2 to approve a resolution urging the State Public Service Commission and the Federal Power Commission to "carry out the intent" of the recent natural gas referendum. Milwaukee voters recently expressed their desire for the natural fuel. but the transmission of that view to the governmental agencies concerned had been delayed.



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Fourteen 30, 000-gal. tanks store propane at the Hunts Point p'ant of Consolidated Edison Co. of New York, Inc. This installation has four 50 Mcf per hour and one 250 Mcf per hour gas air units which vaporize the liquid propane.

Bulk Storage Plants

By ERIC A. FLASCHAR

Manager, Stacey-Dresser Engineering Division, Cleveland, Ohio.

Utilities using LP-Gas are installing bulk storage plants to circumvent transportation problems. Yet 30,-000-gal. tanks are costly, representing over two-thirds of the total investment in propane air plants. In the future, 60-ft. spheres may be the answer.

LIKE many other industries in the postwar period, the liquefied petroleum gas industry is entering a new era. Large quantities of propane and particularly butane went during the war period into the production of high octane gas and into the synthetic rubber program. Today these industries continue to consume large quantities of these hydrocarbons and, in addition, municipalities and utilities are expanding the use of liquefied petroleum gas at a rapid rate. Gas cooking and heating facilities are being provided where none were available; gas-producing facilities which had been overtaxed by wartime demands are being replaced, and utilities are augmenting their present inadequate plant capacities and natural gas supplies.

Sales for domestic use increased again in 1945 by approximately 25% over the all-time high figure of 1944, which was approximately 450 million gals. This gain indicates that the distributors are finding ways to overcome various difficulties in marketing a growing production to meet a growing demand. Manufactured gas companies are using an ever larger amount for increased distribution and for standby gas: they increased their purchases by 25% from 48 million gals. in 1944 to 60 million gals. in 1945, and this year the natural gas utilities are also appearing as large purchasers. Many of the gas utilities supplying natural gas have found that they can mix up to 50% of propane-air with their natural gas to augment their needs. Since a higher heating value propane-air gas is used for interchangeability with natural gas, the actual increase in capacity to meet winter peaks may be as high as 150% of the normal natural gas supply. Thus the natural gas utilities have found an effective method of expanding their facilities to meet their expanded demand, and have become large LP-Gas users and large bulk storage plant owners. Since all of these old and new users have peaks occurring during the winter months, this rapid growth increases the eminent role of bulk storage plants in the LP-Gas industry.

Variations in Plant Sizes

The variation in size of bulk storage plants is very great indeed. From the one storage tank plant required by the small bulk distributor to the 100-tank storage plant required for natural gas distribution systems, we find storage plants in all sizes to serve the larger bulk distributor, the LP-Gas producing plants, and the LP-Gas standby plants for manufactured gas utilities.

When the Phillgas Division of Phillips Petroleum Co. built last summer

a propane standby plant consisting of 15 30,000-gal. storage tanks and the necessary vaporizing equipment for the gas department of the city of Memphis, Tenn., it represented the largest bulk storage plant conceived, but today we are building several plants of considerably larger capacities, and there is no doubt that many more and larger plants are contemplated and will be built. These plants, which will be operated a relatively few days of the year during peak demands, must store a great part of their annual requirements for immediate use.

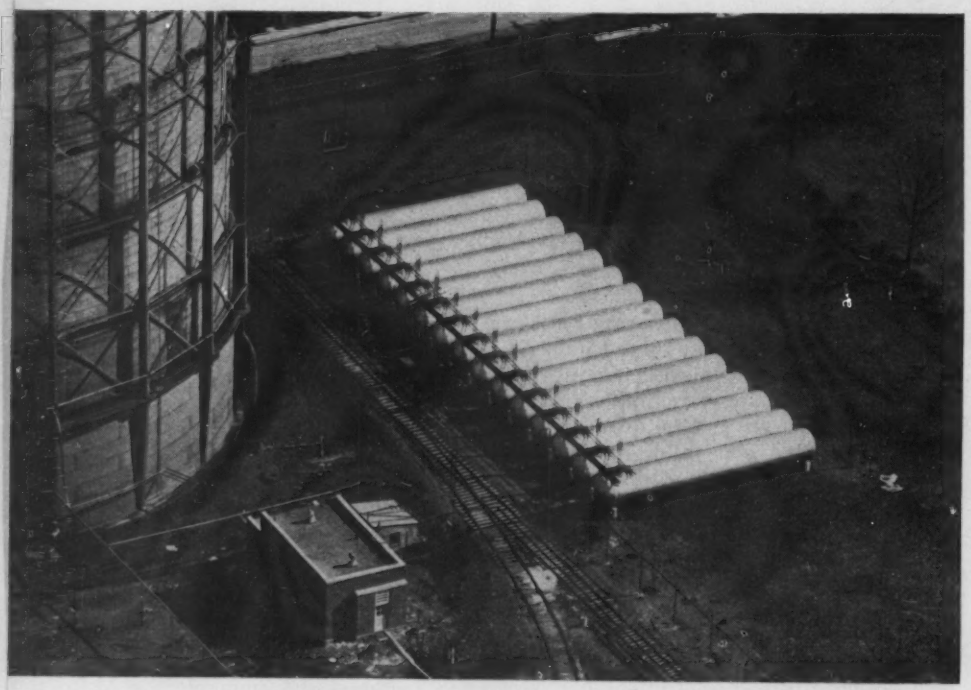
Consumer Must Help

There is not, and will not be for years to come, a scarcity of liquefied petroleum gas, and the rate at which it can be consumed nationwide depends mainly on the transportation and storage facilities available. The annual demand for LP-Gas must flow evenly throughout the entire year in tank cars, barges or pipe lines to the users, who must store such amounts as are required to meet their daily and seasonal peak loads. Were the distributor to store the peak requirements for the seasonal demand, he also would have to have the extra transportation facilities to convey it. Considering the large investment which the distributor would have to tie up in storage and tank cars, it can readily be seen that he could never operate efficiently; and therefore the consumer must shoulder part of this burden by providing his own storage and enabling the distributor to operate with the minimum amount of transportation facilities.

As an example for sizing a bulk storage plant, consider the problem of a gas utility using LP-Gas for meeting peak load demands. From past performance and expected load must be ascertained the total LP-Gas to be added to the system during the maximum demand season, the period of time during which the peak load facilities are expected to operate, and the rates of output required during these periods. Comparing these figures with the best shipping schedules of LP-Gas available to the utility during that same period, the amount of LP-Gas that must be in storage at the beginning of the maximum demand season is readily obtainable. Of course, the users do not wish to provide more storage than is absolutely necessary, but don't let them forget that for every bit of seasonal demand storage which the distributor provides, there must be extra tank cars.

For the quantities of peak load gas involved, there is at present no alternative for the gas utilities other than the use of LP-Gas and bulk storage plants. Each 30,000-gal. tank represents a tremendous storage of Btu's that can be put into the system at a moment's notice. Assuming 25,000 gals. of propane in a tank, this would be equivalent to 2300 million Btu's, or equivalent to 2300 Mcf of 1000-Btu natural gas. Four to five such storage tanks are equivalent to the largest gas holders ever built in this country, but when 10 times this quantity of gas is required, it becomes prohibitive to install gas holders which serve so well for the lower capacities, and the bulk storage of LP-Gas offers the only solution.

It is interesting to note that the investment in a bulk storage plant represents the major portion of the total cost of a propane-air plant. The actual regassification rate does not affect the size of the bulk storage plant but influences the size and cost of vaporizing and other equipment associated with the plant. It is only the total sendout required that is directly associated with the bulk storage plant size. Based on several installations that we are presently building, we can give you the following comparative cost figures. In a propane-air plant that is discharging into a natural gas transmission system at 50 psig, producing the equivalent of 12 MMcf of natural gas per day during eight peak days, and for which 75% of the total sendout of LP-Gas is purchased in the summer months, the bulk storage plant represents 67% of the total investment. For a plant under similar conditions, producing the equivalent of 24 MMcf per day, 75% of the total investment cost is in the bulk storage plant. And for another plant producing the equivalent of 48 MMcf of natural gas per day, 80% of the cost is in storage vessels. Normally it would be anticipated that as the plant size increased, the unit cost would decrease within definite limitations. While this is true for the propane-air plant, exclusive of storage, the cost of storage itself is always a linear function. Thus if a plant requires 10 or 50 tanks, the unit storage cost remains essentially unchanged regardless of the total number of gallons of propane that are stored.



Aerial view of 15 propane tanks placed late last summer at the gas department of the City of Memphis, Tenn. Measuring 62 ft., 6 in. in length, and having an inside diameter of 106 in., they are designed for 200 psi pressure. For views of installation, see next page.

Plant Safety Code

As the size of bulk storage plants increases, the hazards involved multiply. The National Board of Fire Underwriters has set up a safety code which should be strictly adhered to by all concerned. The LP-Gas industry has a good safety record, and it is up to all of us to maintain this performance, as laxity would undoubtedly impose more stringent regulations. It is extremely important that all vessels for bulk storage plants be built in reliable shops and that they be in-

spected and tested at the time of manufacture. It is also of the greatest importance to incorporate all the safety features specified by the code in equipping these tanks.

In the very large bulk storage plants, we have incorporated additional safety features that would not normally be encountered in small tank farms, and an endeavor has been made to incorporate as much flexibility as possible. Groups of tanks can be blocked off in case of fire, and the piping between tanks has been looped so propane flow could be taken in either direction from any group of tanks. Provisions have been made to transfer the contents of any one tank to another if so desired. Should a leak occur, or a fire hazard endanger a certain tank, its contents can be transferred in a relatively short period of time by means of a liquid pump to the other tanks. The quick transfer of propane by means of a pump is a problem in itself, since the propane in the storage tank is under its own vapor pressure, and friction encountered in the suction line will vaporize propane, causing operating difficulties. Rather than elevating the tanks to provide the necessary positive head, which is an expensive and cumbersome method, or locating the pumps in a pit, we have solved this problem by choosing vertical pumps encased in the ground with vertical mounted explosion proof motors.

Standardization Needed

With the trend to large bulk storage plants, there is a greater need for standardization. The National Board of Fire Underwriters has been a great asset in the standardization of LP-Gas equipment. At present a 30,000-gal. water capacity tank is the largest single container permissible for LP-Gas storage. Since the capacity and the working pressure are thus established, there is no reason why there should be variations in the design of these vessels. It would be advantageous to have all these tanks built to standard dimensions by the various manufacturers so that they would be interchangeable. For a bulk storage plant requiring an appreciable number of tanks, the production of more than one tank fabricator must be used to construct the plant economically; unless all the tanks are exactly alike, individual foundation design and special piping problems are introduced. The Butane-Propane Association should undertake the task of standardization and thus benefit the entire industry.

Looking into the future, we should anticipate that the cost of LP-Gas may rise. Although new refinery operations such as cycling plants have increased the amount of LP-Gas available, the demand has also rapidly increased. The use of butane for fuel purposes has already become secondary to its use for high octane gasoline. Other users such as the manufacturers of synthetic rubber and the chemical industries can afford to pay higher prices than the LP-Gas industry, and as their demand increases, the price for butane will further increase. This leaves those industries using LP-Gas for fuel purposes in a position where the cost of their fuel will mount. If the gas utilities are to continue to use liquefied petroleum, something must be done to circumvent the rising cost. Obviously they will not be able to control the cost of the fuel, and their only out is to reduce the cost of their plant. It was previously indicated that storage represents an investment of 67 to 80% for the plants considered, and it will therefore be necessary to find a less expensive method for storing. If the industry is to continue to grow, we likewise must grow with it. It is with this thought in mind that large volume storage units are being introduced.

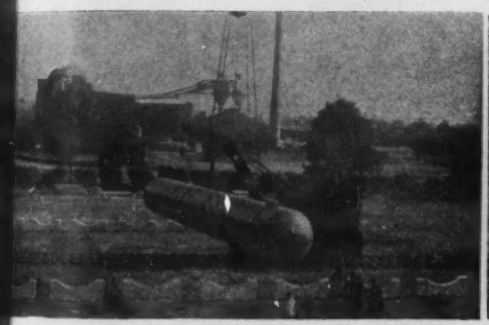
60-Foot Spheres

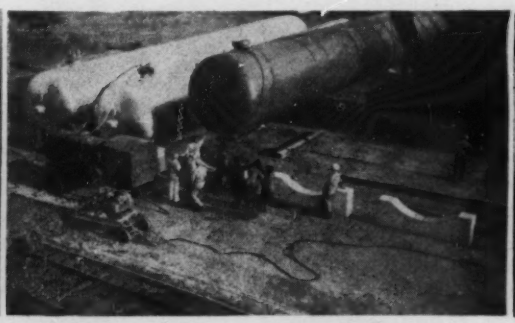
By large volume storage units, we had in mind storing in spheres up to a diameter of 60 ft. This would be equivalent to 34 30,000-gal. tanks. Propane could not be stored at its normal vapor pressure but would have to be stored below the maximum design pressure of the vessels. Fifty psig working pressure for this size spheres and spheroids is not uncommon. Such spheres have proven to operate successfully for many of the hydrocarbons and would, therefore, be merely an extension of this application to propane and butane. The system would require the spheres for storing the liquid gas, a compressor for compressing the vapors, and a vapor condenser cooled by circulating water.

Using large volume storage would eliminate an extensive amount of interconnecting piping. Each tank is normally equipped with a pressure gauge, thermometer, safety relief valves, excess flow valves, and a liquid level indicator; in place of having 30 or 40 sets of controls, one set would be required; it would also simplify all pumping problems. Unloading propane from tank cars would be a very simple operation. Since the liquid in the sphere is at a reduced pressure, the liquid in the tank car would flow by difference in vapor pressure to the sphere. When the tank car is emptied of its liquid contents, the car will be stripped of its vapor content down to the operating pressure in the sphere.

Refrigeration

Assuming that the propane were stored in this tvpe of vessel at 40 psig, the corresponding temperature for the vessels and its contents would be 20° F. It would, therefore, be necessary to





Photos show the job of installing the 30,000-gal. tank at Memphis. In Fig. 1, at left, the first tank is being set in place by a railroad crane. In Fig. 2, storage tank No. 3 is being placed on its supports. The fittings have been installed on Tank No. 2 and an air test is being made with a portable compressor. Two cars of propane have already been unloaded in Tank No. 1. In Fig. 3, all 15 tanks are in place, and all but five of them have been painted. Four propane tank cars are shown at right. and the unloading connections are attached to tank No. 7.

E. A. FLASCHAR

BEFORE JOINING Stacey-Dresser Engineering Division as general manager, Mr. Flaschar was vice president of Hydrocarbon Research, Inc. For nine years he was executive engineer of the M. W. Kellogg Co. and for eight years was assistant chief engineer in one of the refineries of the Standard Oil Co. of California. The article, "Bulk Storage Plants," was originally presented at the convention of the National Butane Propane Association in Chicago, Sept. 24, 1946.

refrigerate the sphere continuously. Propane vapors would be removed, compressed up to 200 psig, and then condensed in a water-cooled condenser. The condensed high pressure liquid would be flashed to the storage pressure and then returned to the tank. The sphere would be insulated with cork or any other suitable insulating material. On the basis of using 3 in. of cork insulation, and an ambient temperature of 100° F, it would require about a 20-hp compressor, a condenser with approximately 200 sq. ft. of surface, and 25 gpm of circulating water. This represents the extreme conditions for operating the system. For a major portion of the year, the ambient temperature would be considerably lower and the heat flux into the tank would be reduced, and thus less refrigeration would be required.

In comparing the cost of this type of storage with that of a tank farm of standard 30,000-gal. tanks, it would be necessary to include the initial investment in the sphere, its insulation, compressor and heat exchanger, and also the operating costs of utilities.

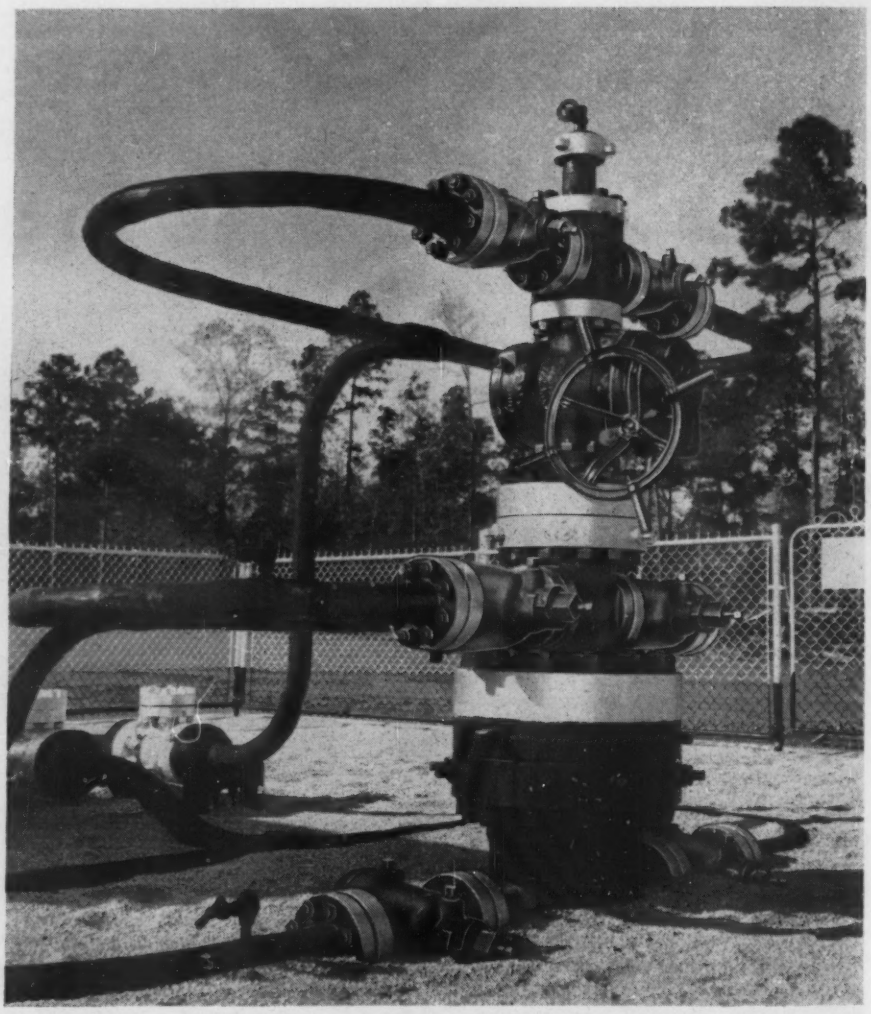
A 60-ft. diameter sphere complete with refrigerating equipment will cost approximately $125,000. The annual operating charges for power and supplies would be about $2100 per year, and would have a present worth of $30,000 based on a 20-year operating period. Thus the total cost of large volume storage unit would be $155,000 as compared to $300,000 for an equivalent tank farm. There will also be an appreciable saving in land requirements, which has not been included in this comparison.

It is to be understood that in considering large volume storage, the principles involved can also be applied to smaller diameter spheres replacing from three to four 30,000-gal. storage tanks. For the smaller size spheres, the gas could be stored at higher pressures and the actual amount of refrigeration and operating costs required would be reduced. Less insulation would be used, and there would be a considerable portion of the year when no refrigeration at all would be required. A careful cost analysis comparing the initial investment in the sphere versus operating cost would determine the most economical pressure at which to store it.

Before this type of storage can be accepted by the industry, it will require careful investigation by all concerned. The matter must also be presented to the National Board of Fire Underwriters for their scrutiny, and for approval of the larger storage volume in a single vessel.

This method of storing will also require additional safety precautions. Spheres should be located farther away from any other operating equipment than storage tanks are at present, and a definite zoning law should specify the minimum fixed distance from the nearest inhabited building. If and where necessary, dikes large enough to confine the entire contents of the sphere could be employed.

THREE-ZONE CHRISTMAS TREE



AN unusual Christmas Tree is located at Lake Creek, Texas, on a lease of the Superior Oil Co. The tree is arranged for production from three zones. Flow lines from each of the three gas zones lead from both sides of the tree and are welded together for the flow to run through check valves.

The bottom flow line which produces between the 5-in. and 7⅝-in. casing, flows at 3000-lb. working pressure. The middle flow line which produces between the 5-in. and the 2½-in. tubing, flows at 2650 lbs. The two top flow lines which produce through the 2½-in. tubing flow at 3350 lbs. Temperature of the gas is 145°F.

The rugged tree is equipped with wrench and gear-operated Nordstrom Hypreseal Valves.

Flue Gas Treatment of Water To Prevent Scaling

By JOHN R. NORDIN

Assistant Plant Superintendent
Butadiene Dept. Southern California Gas Co.

H. W. Edmund, former president of the Pacific Coast Gas Association, presents to the author Servel's check for $500 for his innovation. The ceremony took place at the annual banquet in San Francisco, held during the convention last September.

Several years ago, when he was concerned with service problems of the Southern California Gas Co., Mr. Nordin set to work on the problem of combatting scale formation in air conditioning cooling towers. Service experience with several installations had indicated that upkeep of the systems would be expensive unless some effective means of preventing scale formation could be found. Experiments with the flue products of combustion of the gas which fueled the conditioner proved to be the answer.

So successful was the process that Servel adopted it for use in their all-year air conditioner, and awarded Mr. Nordin a $500 prize in recognition of his accomplishment.

PRACTICALLY all natural water contains some dissolved scale-forming salts. These salts are usually salts of calcium and magnesium and are in the bicarbonate forms, which are very soluble in water. With the addition of heat and/or evaporation, the bicarbonates are readily decomposed to carbonates, water, and carbon dioxide. This may be shown chemically as follows:

$$Ca(HCO_3)2 + Heat = CaCO_3 + H_2O$$

The carbonates of calcium and magnesium are the scale-forming salts. The solubility of calcium carbonate varies from approximately 15 p.p.m. in 75°F water to 20 p.p.m. in 200°F water. When the concentration of calcium carbonate exceeds these limits it precipitates to form a scale, a process commonly called "liming". In water containing sufficient carbon dioxide, the solubility may be increased as much as 70 times, or to 1050 p.p.m. in 75°F water.

Evaporation Deposits Solids

A water cooling tower provides cooling by means of evaporation and differential heat transfer. The ratio of the two varies with atmospheric condition, but practically all cooling is the result of the heat given up when some of the water evaporates. As the water evaporates, the dissolved solids are left in the remaining water. In order to keep the quantity of water constant in the system, make-up water is required and additional solids are added. Continued evaporation raises the solids content until the saturation point is reached, and the excess solids are then deposited as scale. The following example is given for clarification, and the figures given are assumed:

Total Capacity of the System	100 gal.
Rate of Evaporation	20 gal./hr.
Make-up (Fresh Water)	20 gal./hr.
Calcium Carbonate in Make-up Water	5 p. p. m.

After five hours, 100 gal. of water will have evaporated and 100 gal. of make-up water will have been added. Since the dissolved salts have remained in the system, the concentration has doubled to 10 p.p.m. In another five hours the concentration will have increased to 15 p.p.m. It may be seen that any further operation will increase the solids so that scale formation and deposition can be expected.

The period of operation without deposition of scale can be lengthened by providing a continuous blowdown arrangement on the circulating water system. In this manner, a certain amount of the solids can be wasted to the sewer. If the bleed-off rate were set at 5 gal. per hour, the time could be extended from 10 hours to approximately 20 hours before scale deposition would be expected.

50% Water Addition Needed

In this particular example, the bleed-off rate would have to be greater than 10 gal. per minute, in order to keep the concentration of the scale-forming salts below 15 p.p.m. It can be seen in this relatively simple problem that an additional 50% of the necessary cooling water is required to be wasted to prevent possible scale formation.

In practical applications, most often the solids in the make-up water vary seasonly, and are usually higher during the season when cooling towers for air conditioning units are being used. If scale is deposited on the heat transfer surfaces, efficiencies and capacities are reduced at a time when they should be at their maximum.

Softener Cost Prohibitive

Large systems can afford water softeners economically, but with the smaller systems the investment is prohibitive. Chemicals can be added to the smaller systems during operation, but again the use of proportioning devices and continual replenishment of the chemicals become relatively ex-

Table 1. Service Costs Using Flue Gas

	Average Hours on Cooling Per Month	Average Hours on Cooling Per Year	Cooling Tower Service Cost in Man Hours 1943	Cooling Tower Service Cost in Man Hours 1944	Flue Gas Feeder Installed
Unit No. 1	295	3540	29.28	9.60	2/5/44
Unit No. 2	186	2230	21.00	7.44	2/5/44
Unit No. 3	118	1420	11.04	21.00	None

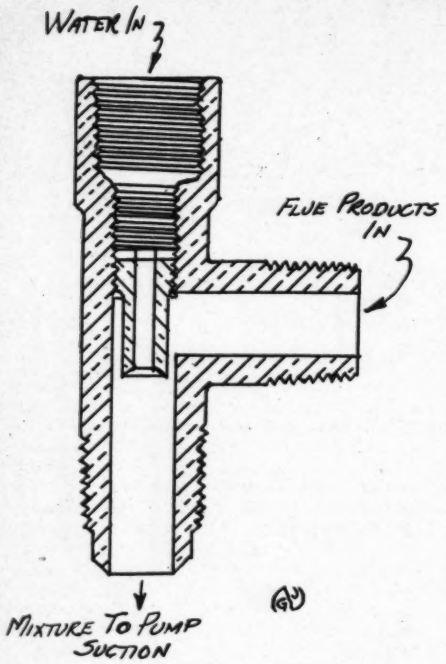


Fig. 1. Cross section of jet feeder.

pensive, because of both material and labor costs. With these items as a background, several methods of water control were tried on some small gas-fired air conditioning unit cooling towers, in order to find a method which would give satisfactory service, with the minimum of operating and maintenance expense. It was known that the correct amount of dissolved carbon dioxide in the cooling system would prevent scale formation. Insufficient quantities would allow some scaling, and excessive quantities would cause corrosion. A ready source of carbon dioxide gas was available in the flue products of the natural gas combustion.

The first attempt to introduce the flue products into the water system utilized a small venturi, but this was discarded in favor of a jet feeder, because the jet was simple to make and seemed to have better characteristics. A cross-section of this jet is shown in *Fig. 1.* This fitting is quite small, measuring approximately 2 in. in length, and having ⅛-in. pipe and ¼-in. tubing connections. This feeder was installed in the water cooling circuit, as shown in *Fig. 2.*

Partial Vacuum

A small amount of water is diverted from the circulating pump discharge through a strainer to the orifice of the jet. The aspirating effect produces a partial vacuum at the side of the fitting. A small line is run from the conditioner fire box to provide a source of carbon dioxide in the flue products. The flue gas and water are mixed in the tail pipe and introduced into the pump suction to be circulated through the system under pressure to the tower nozzles. At this point, any excess gas goes out with the cooling air.

This method of flue gas injection is automatic, in that flue products are always available when the unit is in operation. The rate of feed is dependent upon the pump pressure, which in turn directly reflects the condition of the system. If there is some scale in the system the pump pressure increases, which in turn causes the jet to inject additional flue products which will dissolve the scale. The pressure reduces and the quantity of flue gas is similarly reduced, affording a balance of sufficient flue gas to prevent further scaling.

Relative Costs

Table I gives some service cost data on three units of the same size operating at one location. These units were used to condition three different zones and for this reason their hours of operation are shown.

Table 2. Observations of Algae Reactions

	Algae	Corrosion	Cleanliness
Unit No. 1.....	slight	slight	Mud in sump and on screen
Unit No. 2.....	slight	slight	Mud in sump and on screen
Unit No. 3.....	profuse	slight	Sump filled with algae and suction screen collapsed because of algae deposits

It may be noted that the service costs dropped considerably on the two units with the flue gas water treatment, while the third unit without the treatment shows a marked increase.

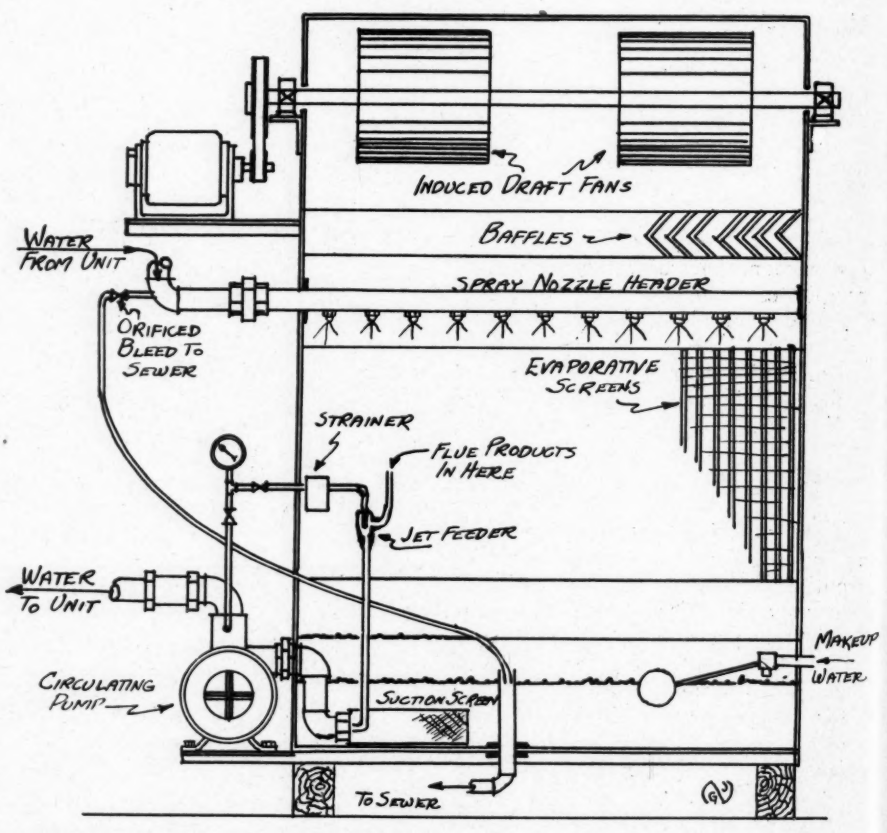
Another problem with cooling tower water is the growth of algae and bacteria, which plug screens and small openings. An interesting sidelight is that the flue gas treatment retards their growth, either because of some toxin present in the flue gas, or some other chemical action not entirely explained.

Sump Conditions

Conditions observed in the tower sumps during service calls are shown in *Table 2.*

The flue gas treatment provides a very inexpensive and effective means for water control in small cooling towers of the type shown. Maintenance is minimized and the chemicals used are free by-products. This system is now being used successfully in other parts of the United States.

Fig. 2. Water cooling plant circuit, showing installation of jet feeder.



COMPUTING GAS RESERVES

ESTIMATES MAY BE ALTERED BY TWO FACTORS: DELIVERABILITY, AND THE POSSIBILITY OF FINDING ADDED VOLUMES OFF THE GULF COAST

By E. DeGOLYER

DeGolyer & MacNaughton
Dallas, Texas

STUDIES during the past few years have resulted in numerous estimates of proved recoverable natural gas reserves for the United States which range from 130 to 150 trillion cu. ft. It is my opinion that these estimates are conservative, as are all estimates which must be proved by available data.

Two phases of the subject of reserves, I believe, should be foremost in the minds of the natural gas industry: first, the availability or deliverability of the proved natural gas reserves; second, the possibility of finding additional gas reserves in the sedimentary rock underlying the Gulf of Mexico.

Deliverability of Proved Natural Gas Reserves

It has been my experience that in considering reserves there is an immediate tendency to divide the proved reserves by the latest annual production rate to determine the life of our supply. This is a fallacy. Gas cannot be produced at any desired rate from the permeable rock in which it occurs. This is because the flow of gas through the pores of the rock is controlled by physical factors in the reservoir, particularly reservoir pressure. The proved reserves of natural gas will be produced over a period of many years but the deliverability of present wells will decline. Accordingly, it is incorrect to divide the known reserves by any current rate of production or by any anticipated rate of withdrawal in estimating the life of proved reserves.

In calculating the life of proved gas reserves, a knowledge of the productivity of the wells in future years is of utmost importance to management and the public. Wells must be capable of producing enough gas to fill the pipe lines during seasonal peak loads despite reduction of reservoir pressures by withdrawal of gas. If seasonal peak requirements are not met, public interest will not be served as well in the future as in the past.

More engineering data are required to determine this future productivity of wells and, ultimately, reservoirs. Data required are detailed well and reservoir histories, including accurate, periodic back pressure tests and the results of cleaning out, remedial, and acidizing programs. Some data are available on a few fields but standard procedures should be set up. Regular tests under such procedure should be made. The systematic collection of such data will increase operating costs but will afford reliable information for the calculation of the future deliverability of gas reserves. Management could operate more efficiently if such data were available today on all gas reservoirs. It would be of considerable assistance in the projection of trunk lines, design and re-design of gathering systems and compressor plant installations, and, most important, computation of future rate schedules for gas sales.

Gas reserve estimates are not enough. The paramount factor is the rate at which these reserves can and will be produced: in a word, deliverability.

For a look into the future as to what it takes to provide deliverability to meet seasonal peak loads, I cite California, where flare gas is a thing of the past. Practically all fields are connected to natural gas pipe lines and the price paid for gas at the mouth of the well in Rio Vista field, to name only one, is 12 cents per Mcf.

To provide deliverability I foresee a network of gas lines connecting oil and gas fields, similar to the oil pipe lines which now spread their tentacles to almost every oil field, whether large or small. In other words, I hope to see all available natural gas fields connected to pipe lines because only by such conservation measures can the gas reserves of today be made available over a maximum number of years.

The Possibility of Finding Additional Reserves off the Gulf Coast

It is my opinion that additional petroleum reserves will be found in the subsurface rocks underlying the Gulf of Mexico. This statement is based on the facts that: (1) underlying sediments in certain portions of the area are favorable to the finding of thick sand bodies; (2) structural conditions are known to exist, and (3) the area is adjacent to a known petroliferous province.

Probability studies of the area of some 5000 square miles, situated within the 30-ft. water depth contour extending and lying offshore from the Sabine river, on the west, to the Mississippi river on the east, indicate that at least 30 structures should be present. Geophysical mapping has definitely shown the existence of at least six piercement type domes and 12 additional structures. More detailed mapping of this specific area will, without doubt, narrow the gap between the 18 known structures and the 30 structures indicated in the area.

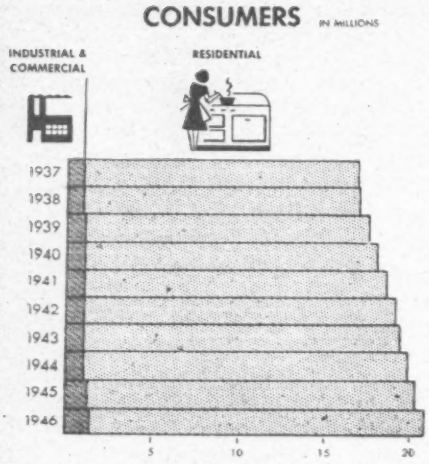
With such a number of untested structures located just offshore from the prolific Louisiana Gulf Coast petroliferous province, it is unbelievable that the drill will not uncover large quantities of underground gas, oil and condensate.

One cannot be specific in estimating the additional gas reserves which will be proved when the structures are drilled. As a gauge, however, it is pointed out that such large fields as Paradis, Erath, Bateman Lake, and Bayou Sale are adjacent to the shore of the Gulf and lie just to the north of this area. Such evidence could cause one's imagination to run riot and to attempt to forecast the amount of petroleum which will ultimately be produced from this offshore area. However, until the tough engineering problem of how to drill and produce these structures at a reasonable cost is solved, it is pointless to waste time endeavoring to estimate the petroleum reserves which may be obtained.

The gas industry today appears to be on the threshold of a great expansion. In this regard I say to you, as I have said before, with the diminishing of the waste of gas each year, the material increase in the volume of natural gas discoveries, and the continued planning for the future by management, I feel no apprehension as to the ability of the industry to meet market demands in the foreseeable future.

From an address presented at the INGAA meeting in November.

Mr. Hargrove Reports on '46



THE gas industry completed the year 1946 with an enviable record. On the one hand it demonstrated its traditional stability and soundness by passing through the difficult reconversion period without losing a step in its march of progress. All-time records were established in every category of the industry with the exception of industrial sales, which levelled off from wartime peaks, reflecting general unsettled business conditions. More people used gas than ever before and more innovations in gas appliances appeared on the market than in any year in the past decade.

STATISTICS

At the close of the year, customers of the gas utility companies reached a new high of 20,835,000, an increase of 2.7% over 1945. Of this number, 9,401,000 consumers received natural gas, 8,973,000 were served with manufactured gas and 2,461,000 used mixed gas.

Total industry revenues of the utility gas industry aggregated $1,205,992,000, an increase of 4% as compared with the previous year. Most substantial increases occurred in the residential and commercial classifications, while industrial revenues maintained their high 1945 levels.

Natural gas revenues were more than $705,000,000, an increase of 3.4%, while revenues from manufactured gas jumped 5.6% over 1945 to approximately $392,000,000. Mixed gas returns advanced 2.4% to a total of $109,000,000.

Sales of natural gas, totaling 2,192,778 MMcf, were slightly greater than in the previous year, with substantial increases being recorded in residential and commercial gas. Manufactured gas sales were 412,053 MMcf or 4.2% higher, while mixed gas sales advanced 3.7% to 145,832 MMcf. In both instances, residential and commercial gas registered gains in the neighborhood of 8% as compared with 1945.

A comparison of 1946 figures with those of a decade ago reveals significant if not startling advances. The gas industry, not including the LP-gas branch, has gained 26.6% in total consumers attached to its lines, 77% in sales volume and 57% in total revenues.

Indicative of the rapid growth anticipated, it is estimated that in the four years, 1946 to 1949 inclusive, the gas industry will add 2,535,000 new customers (not including the LP-gas industry). Further, it is calculated that during this four-year period construction expenditures will be $653,323,000 for physical plant extension; $278,413,000 for ordinary maintenance expenditures; and $14,430,500 for house piping materials — a grand total of $946,168,500.

HOUSE HEATING

By far the most outstanding phenomenon of the year was the tremendous demand for gas heating.

Not only in the existing market but also in the new home field, a strong preference for gas heating was apparent. The National Housing Agency, for example, reported recently that of the 629,000 dwelling units planned under the veterans' emergency housing program up to July 26, 1946, gas heating systems were specified in 52%, with coal and oil amounting to 27% and 21% respectively.

APPLIANCE PRODUCTION

All factors considered, creditable levels of appliance production were attained at the year's end. Sales of automatic gas water heaters totaled 1,250,000 units—an all-time high level. Expanded production facilities, when unhampered by labor and supply curtailments, will enable this branch of the industry to more than double its 1941 peak production.

The trend in water heaters is toward larger sizes. A lucrative market for large volume gas water heaters was created with the introduction and rapid growth of chain-store laundryettes.

Gas range production during the year reached 1,600,000 units.

The total number of homes heated by gas increased more than 15% during the year. Gas house heating units produced totaled more than 600,000.

APPLIANCE DEVELOPMENTS

Emerging from the strait-jacket of wartime restrictions but still bedevilled with peacetime material and labor problems, gas appliance and equipment manufacturers gave a remarkable exhibition of their products during the annual convention last fall.

Of particular interest in the domestic appliance field was the marked trend toward automatic operation of gas equipment apparent at the exhibition.

An interesting development in the house heating field was a midget gas furnace, weighing 70 lbs., capable of heating two-and-one-half rooms, which had its origin in the airplane heaters developed during the war. Gas radiant heating is gaining wide acceptance by builders who previously let it lie in the laboratory.

During the past year, the gas turbine caught the interest of people concerned with new primary sources of power.

NATURAL GAS EXPANSION

The natural gas industry in the past decade has grown at an accelerated pace. It now serves an area with a population of 41 million in 33 states, using a network of 220,000 miles of trunk lines and mains with a total production of four trillion cubic feet, including other than utility sales, and a market value of $850 million. It has advanced from 41% to 48% in the number of customers served by the whole gas industry. Total assets are more than four billion dollars.

Approval of new long distance pipe line construction continues at a rapid pace. In addition to a new 1200-mile line from Texas to California, costing $70 million, other pipe line projects approved and under way this past year, involve a total additional mileage of 2640 miles and an expenditure of $120 million.

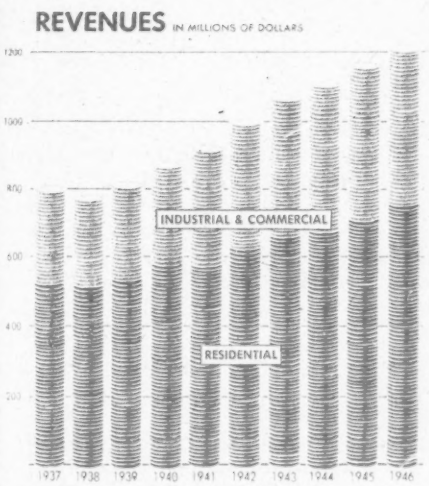
Development of synthetic gasoline from natural gas that appears to be competitive with gasoline produced from petroleum is a notable recent event.

Also noteworthy is the increasing recognition of the chemical values represented by natural gas and its products. The present trend is toward greatly increased utilization of the natural hydrocarbons as raw materials and intermediates.

RESEARCH AND PROMOTIONAL

The Association's Research and Promotional Plan, launched October 1, 1944, has been the main motivating force responsible for the gas industry's rapid progress immediately following the war. Gas company subscriptions totaling more than $1,600,000 per year, in addition to the regular association budget, are being expended for research, promotion and advertising.

An entirely new field of endeavor in the history of the association is the gas production research feature of the industry plan, which calls for the discovery of better and cheaper methods of producing gas for the benefit of the ultimate consumer. Partly as a result of this activity, plant capacities to meet peak loads in the manufactured gas



industry have been increased an estimated 35% over the past two years.

A great deal has been accomplished in developing greater plant capacities through the reforming of hydrocarbon gases and by other equipment and process modifications.

Much time has been devoted to the task of determining which new gas production processes offer sufficient promise to justify further research on a laboratory pilot plant scale. Of those investigated, the fluidization process is being further explored on a laboratory research basis. The possibility of using high coke oil in a regenerative oil gas set for the production of a high Btu gas is also scheduled for an early plant scale test.

Basic studies have included laboratory determinations of the fundamental reactions between oxygen-steam and carbon and between steam and carbon, and a search for sulfur-resistant catalysts.

UTILIZATION RESEARCH

The gas industry, through its association, has under way a comprehensive research program designed to improve domestic, industrial and commercial utilization and to develop new uses for gas.

Research projects in this program include cooking, water heating, space heating, summer air conditioning, venting, and burners, controls and accessories.

Specialized technical projects have been assigned to Battelle Memorial Institute, Columbus; Case School of Applied Science, Cleveland; Institute of Gas Technology, Chicago; Arthur D. Little, Inc., Cambridge; Purdue Research Foundation, Lafayette; and the A.G.A. Testing Laboratories, Cleveland.

A report on the interchangeability of other fuel gases with natural gases has been published. Data covering the performance of appliances adjusted for natural gas when various kinds of supplemental gas mixtures are employed has been plotted to provide operators with quick and ready means of obtaining necessary factors for interchanging gas fuels for peak loads.

Other projects cover a variety of subjects, including the possibilities of storing natural gas in hydrate form.

NATIONAL ADVERTISING

The gas industry's national advertising program, financed by gas utility companies throughout the country, spent in excess of $850,000 in 1946 for advertising gas appliances, equipment and services. This represents a stepping up of total circulation of magazines used from 47,500,000 to 57,000,000 and of total messages from 215,000,000 to 224,600,000.

PROMOTIONAL ACTIVITIES

Promotional activities conducted during the past active year as a part of the enlarged industry plan have included the preparation of manuals on home laundries; the operation of the Commercial Cooking and New Freedom Gas Kitchen promotional bureaus; exhibitions in national shows; the sponsoring in promotional form of the Reference Manual of Modern Gas Service and New Freedom Gas Kitchen pamphlets. One of the most important of these steps has been the conduct of a public opinion poll on gas appliances and gas services for the purpose of guiding future promotional programs.

A.G.A. LABORATORIES

The American Gas Association's Testing Laboratories in Cleveland and Los Angeles returned to their first year of full peacetime operations extending every possible aid to manufacturers in speeding production of approved gas appliances. Testing and inspecting of new models for compliance with approved standards, and checking appliances that are in production on assembly lines, arose above prewar levels at midyear.

Reflecting the resumption of gas appliance production, testing activities increased 220% over last year, while factory inspections were greatly stepped up as production was resumed. The decided trend towards gas house heating was reflected in the fact that about 40% of test work was devoted to gas-designed central-heating equipment in addition to extensive testing of conversion burners for existing house-heating installations.

Paralleling these services, the research projects assigned to the laboratories were likewise expanded. Activities in this field increased some 30% over 1945. Advances in appliance efficiency, performance and design were pioneered while kitchen ventilation studies attracted wide attention.

INDUSTRIAL AND COMMERCIAL

Many new uses for industrial gas which were developed during the war are now in service in the processing of products made of metal and other materials. Industries using heat in their manufacturing processes have come to look to gas as the premier industrial fuel for accuracy and quality of performance as well as speed and labor saving. Newly designed equipment includes large paint drying and finishing ovens for automobile body drying, radiant gas burners for ceramic furnaces and high-speed direct flame heat-treating.

TECHNICAL DEVELOPMENTS

The association continued to sponsor technical conferences covering gas production, chemical, distribution and motor vehicle practices.

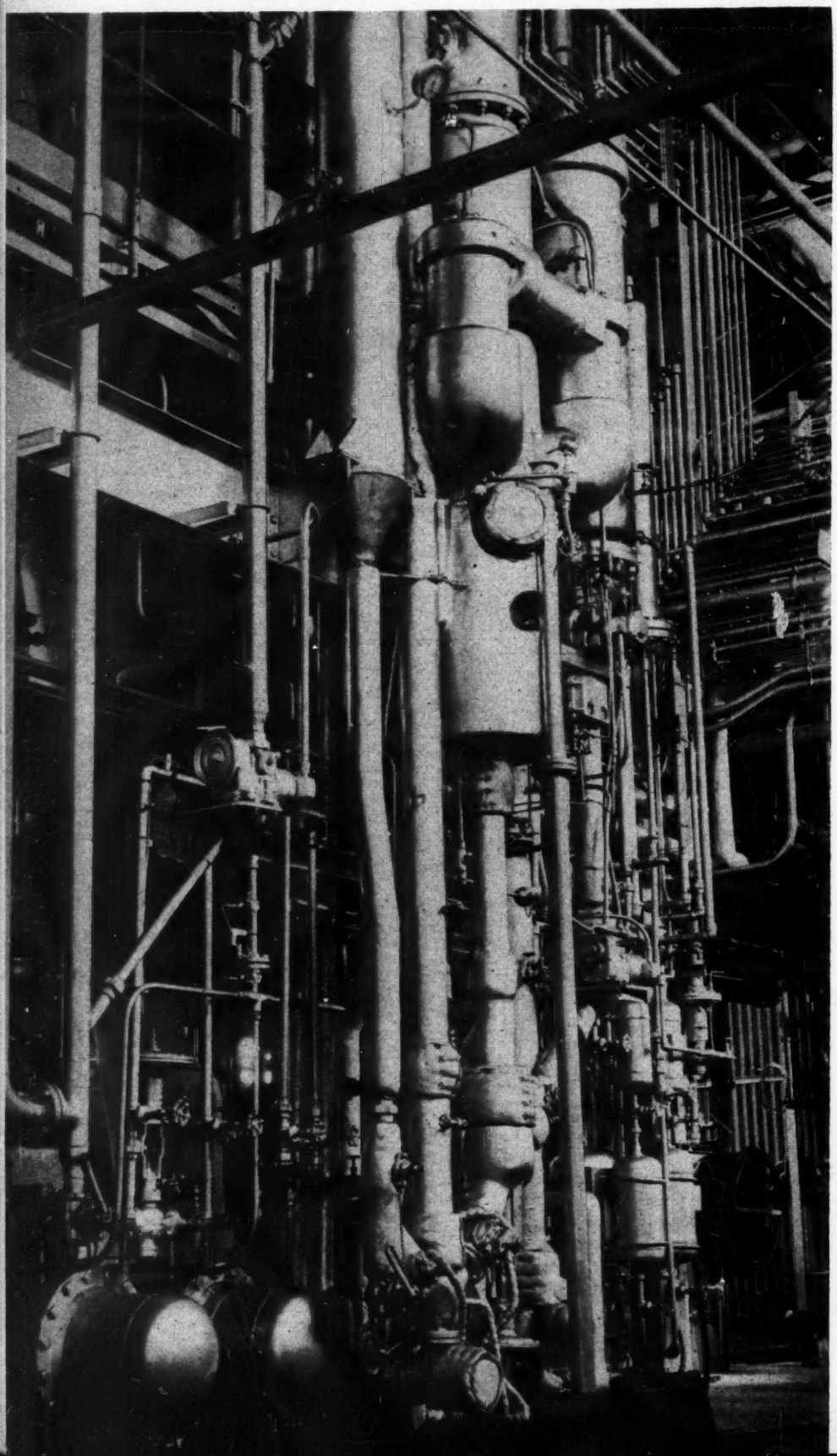
A development of interest to the technical men was the introduction on an experimental basis of plastic tubing for gas service piping as a substitute for conventional metallic pipe.

The use of radio for prompt communication in emergencies and for other purposes is increasing steadily.

From "The Gas Industry in 1946," year-end report by A.G.A. President R. H. Hargrove.

HYPERSORPTION

A Process for Separation of Light Gases



By CLYDE BERG

Union Oil Co., Los Angeles

HYPERSORPTION is a light hydrocarbon recovery process developed by Union Oil Co. of California to permit processing and recovery of hydrocarbons from streams that cannot be handled economically by the conventional recovery processes.

The process employs a moving bed of activated carbon to adsorb hydrocarbons out of lean gas streams. Its applications include the recovery of ethylene from gases produced in thermal and catalytic cracking operations, the recovery of propane and heavier components from natural gas, the separation of methane from hydrogen, and many other separations.

The essential operation of Hypersorption involves the contacting of the feed gas stream with a moving bed of activated carbon which has been previously stripped and cooled to the desired temperature. Separation of the components of the feed takes place in the contacting bed by controlled selective adsorption of the heavier constituents. These are subsequently stripped from the carbon at an elevated temperature by steam. The stripped carbon is returned to the top of the unit where it is dehydrated and cooled and the cycle of operation repeated.

Pilot Plant Experiments

Development of this process has involved extensive pilot plant operations. The final design represents the culmination of practical experience in the operation of a number of pilot plants through progressive stages in the mechanical development. Several pilot plants were employed in the separation studies which were made simultaneously with and following the mechanical development period.

Fundamental studies of the equilibria of hydrocarbons over activated carbon have been combined into corre-

Fig. 1. At left is shown the Hypersorption pilot plant developed by Union Oil Co. of Los Angeles.

lations permitting the design of Hypersorption units on a rational basis. Glass flow models were employed in the initial studies on the motion of solids in various portions of the Hypersorption unit. The relationships governing the heat transfer in the cooler and stripper of the Hypersorption unit have been determined in the pilot plant units and correlated on the basis of theoretically derived heat transfer equations. Special models were built to evaluate such pertinent operations in the Hypersorption unit as the allowable gas velocities through the adsorption bed, allowable disengaging velocities over the bed, mechanics of the separation of suspended solids from the lift gas, flow of gases through the sealing leg, and other items of fundamental interest from a design engineering standpoint. In *Fig. 1* is presented a photograph of one of the Hypersorption pilot plants employed in this development.

Adsorption Capacity of Activated Carbon

The basic process and economic factors which justify the development of the operation employing activated carbon for the separation of light gases are best explained by considering the characteristics of activated carbon as an adsorption medium.

Activated carbon possesses the characteristic of being able to adsorb relatively large quantities of volatile hydrocarbons at low pressures. To duplicate such recovery by alternative means would involve high circulation of absorption oil or extreme low temperature fractionation operations. This is illustrated in *Table 1* which shows the comparable retentions of activated carbon and a 200 molecular weight absorption oil.

It will be noted in the table that the comparable retentions per lb. of adsorbent or absorbent range as high as 90 to 1 in favor of activated carbon. The ratio becomes more favorable towards the lower pressure ranges which is advantageous since separations directed toward high recovery and high purity of products must achieve reduction in partial pressure of the desired component in the effluent gas stream to the order of a fraction of a pound. The cost of light hydrocarbon recovery operations involves as a principal factor the utility cost required to heat and cool the circulating medium. The low mass quantity of activated carbon required for a given recovery with the attendant utility economies constitutes one of the major justifying factors for its use.

The ability of activated carbon to retain trace quantities extends into the range of heavier hydrocarbons and chemical compounds in a manner similar to that illustrated above. The advantages of these characteristics have been generally recognized in the use of activated carbon for solvent recovery and gas purification in fixed bed type units.

The Hypersorption unit comprises two major heat transfer sections, consisting of vertical tube in shell exchangers, separated by adsorption and rectifying sections with internals for introduction and take-off of the va-

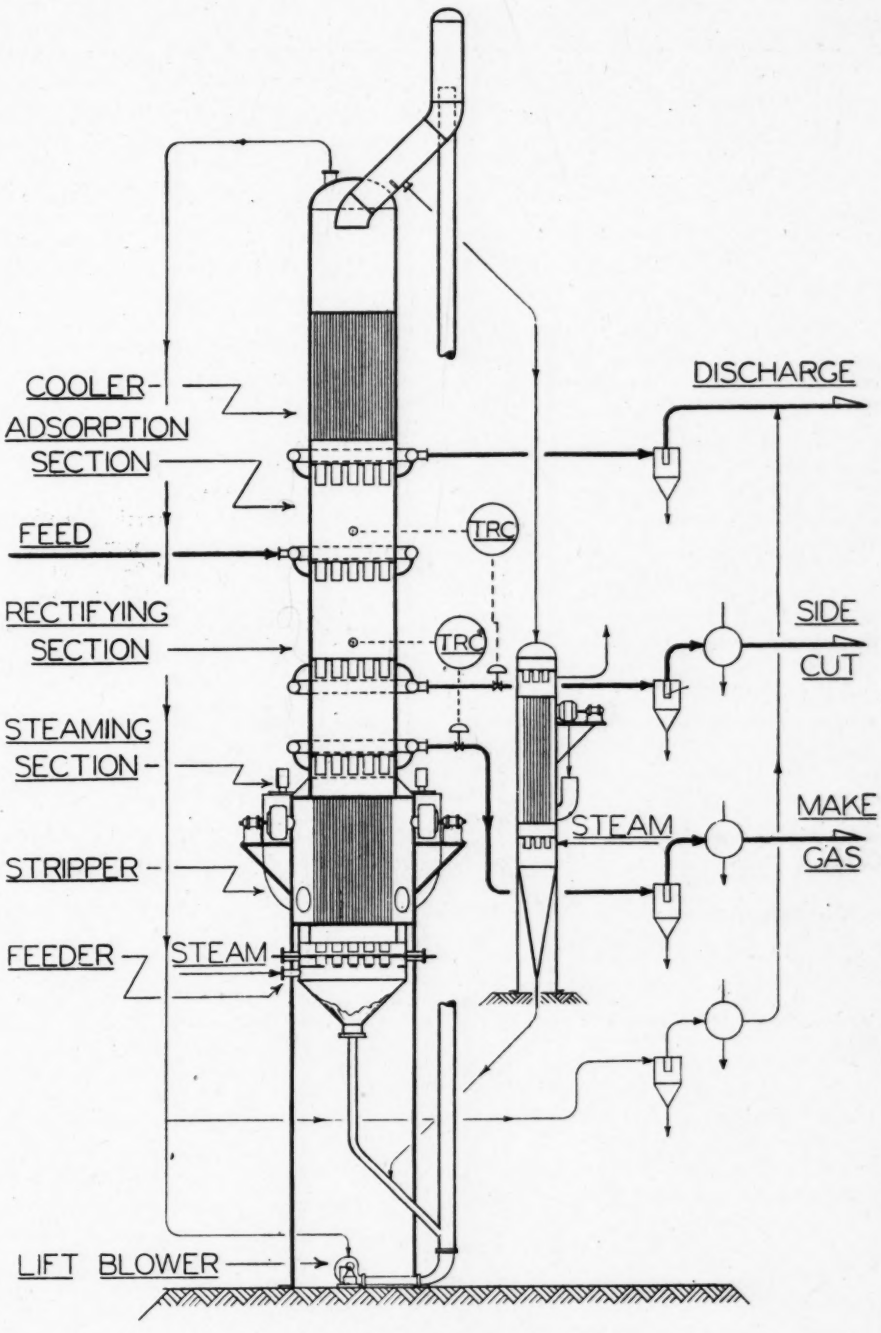


Fig. 2. Diagram of Hypersorption Unit.

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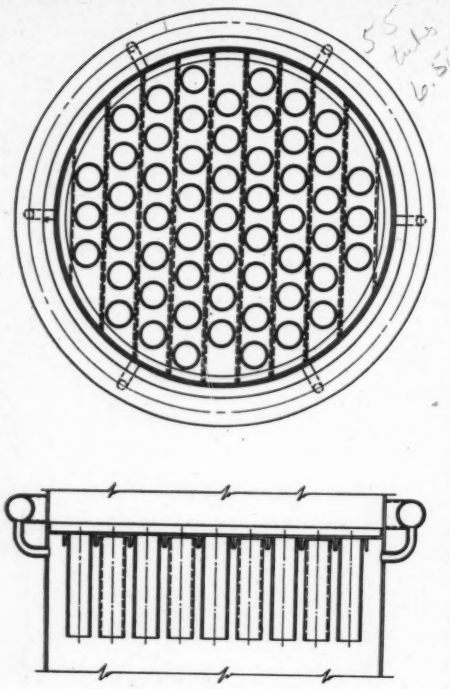

Fig. 3. Engaging and disengaging tray construction.

rious gas streams. These components are assembled to form one vertical cylindrical column with a cooler at the top and stripper at the bottom. A gas lift system is incorporated for circulating solids from the bottom of the unit to the top. This construction is illustrated in *Fig. 2.*

The unit is filled with a bed of granular activated carbon, the upper level of which is maintained in a hopper at the top of the unit. This continuous bed slowly moves downward and the circulation is controlled by the rate of release of the activated carbon from the base of the column into the lift system used to return the activated carbon to the hopper at the top of unit.

The activated carbon passes down from the hopper through vertical tubes where it is cooled prior to entrance to the adsorbing sections below. A gas stream simultaneously flows countercurrent to the carbon passing through the cooler and serves to remove effectively any water vapor retained on the carbon from the stripping operation.

The feed gas is introduced through a distribution plate near the center of the adsorption section and passes upward countercurrent to the moving bed of activated carbon. The unadsorbed lighter components are discharged at the top of the adsorption section just below the cooler. The activated carbon below the feed point, which contains the adsorbed heavier components, passes downward to the rectifying section where it contacts a reflux of heavy constituents liberated by the stripper at the bottom of the unit. This reflux serves to liberate any lighter constituents which may contaminate the adsorbed material. A concentration of intermediate constituents in the vapor phase develops in this section, and if desired, a disengaging tray may be located at this point and the intermediate constituents produced as a sidecut.

The activated carbon flows downward through a lower disengaging section and into a short steaming section directly above the stripper proper. There it meets an upward flow of steam liberating the absorbed heavier components which are either produced as bottom product gas or returned to the rectifying section above as reflux.

Steam introduced below the stripper passes countercurrent to the activated

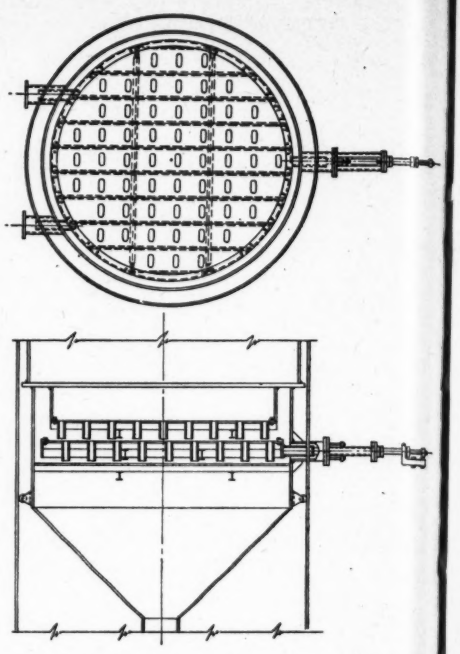

Fig. 4. Flow control mechanism.

carbon in the vertical stripper tubes, through the steaming section, and is discharged with the bottom product gas. The increase in temperature of the carbon throughout the steaming and stripping section is gradual, the highest temperature being attained at the base of the stripper. Most of the adsorbed materials are removed before the carbon passes through the stripper tubes proper. The flow of activated carbon leaving the base of the unit is controlled by means of a specially designed feed mechanism which gives positive control of the flow distribution in the cross section of the unit. The activated carbon drops from this mechanism into a sealing leg which restricts flow of steam into the lift system. The activated carbon is transported to the top of the Hypersorber tower by an elevator or gas lift and drops into the hopper located at the top of the unit.

Table 1. Comparison of the Capacities of Activated Carbon and Absorption Oil for Retention of High Hydrocarbons

60-Min. Chloropicrin Activity Cocoanut Shell Activated Carbon 200-Molecular Weight Absorption Oil

Hydrocarbon	lbs. abs.	Retention on Activated Carbon lbs. per lb.	Retention by Absorption Oil lbs. per lb.	Ratio of Adsorption to Absorp.
Methane	1	.00199	.000022	90.5
	10	.0075	.00022	34.0
	25	.0139	.00055	25.2
	40	.022	.00088	25.0
Ethane	1	.023	.00027	85.0
	10	.065	.0027	24.1
	25	.090	.0068	13.2
	40	.122	.0107	11.4
Propane	1	.113	.0014	80.7
	10	.172	.0140	12.3
	25	.186	.0340	5.5
	40	.200	.055	3.6

Carbon Steam Circulated

For the purpose of maintaining a high level of activity, a reactivation unit is provided which circulates a small stream of carbon in parallel with the Hypersorber and carries out a high temperature, steam stripping operation to remove any accumulation of heavy residual hydrocarbons on the adsorbent.

The adsorption of gas on activated carbon is exothermic and, since heavier components are more readily adsorbed than the lighter constituents, the temperature of the activated carbon bed is characteristic of the composition of the materials being adsorbed at any given point. Control of the separation

in the Hypersorption unit utilizes this principle.

The sidecut and bottom make gas streams are governed by automatic temperature controllers which operate on the rather substantial temperature breaks which correspond to the separation points between the various classes of components being treated.

Specific Mechanical Details

The basic concept of the design of the Hypersorption unit is predicated upon positive control of the motion of solids in the unit. All the flow paths have been designed so as to be symmetrical across the area of the unit and to permit virtually vertical downward motion of the solids with minimum opportunity for channeling or unequal flow distribution. The internals of the unit, consisting of engaging and disengaging trays, are constructed with a similar view and consist of circular plates having symmetrically spaced downspouts through which the solids pass and under which the gases are permitted to engage or disengage. The flow control mechanism of the positive displacement type assures equal flow throughout the cross sectional area at the base of the unit.

In *Fig. 3* is illustrated the typical construction of the engaging and disengaging trays employed in the Hypersorption unit. This tray has a number of geometrically arranged downspouts which serve to conduct the solids downward in a uniform manner throughout the cross sectional area of the trap. Disengaging of the gases occurs underneath the tray and the respective amounts of area inside the tubes and outside the tubes is proportioned in accordance with the flow quantities of gas either disengaged or fed upward in the unit through the downspout section. A number of inlet or outlet points is employed to minimize pressure drop in the gas distribution across large diameter trays.

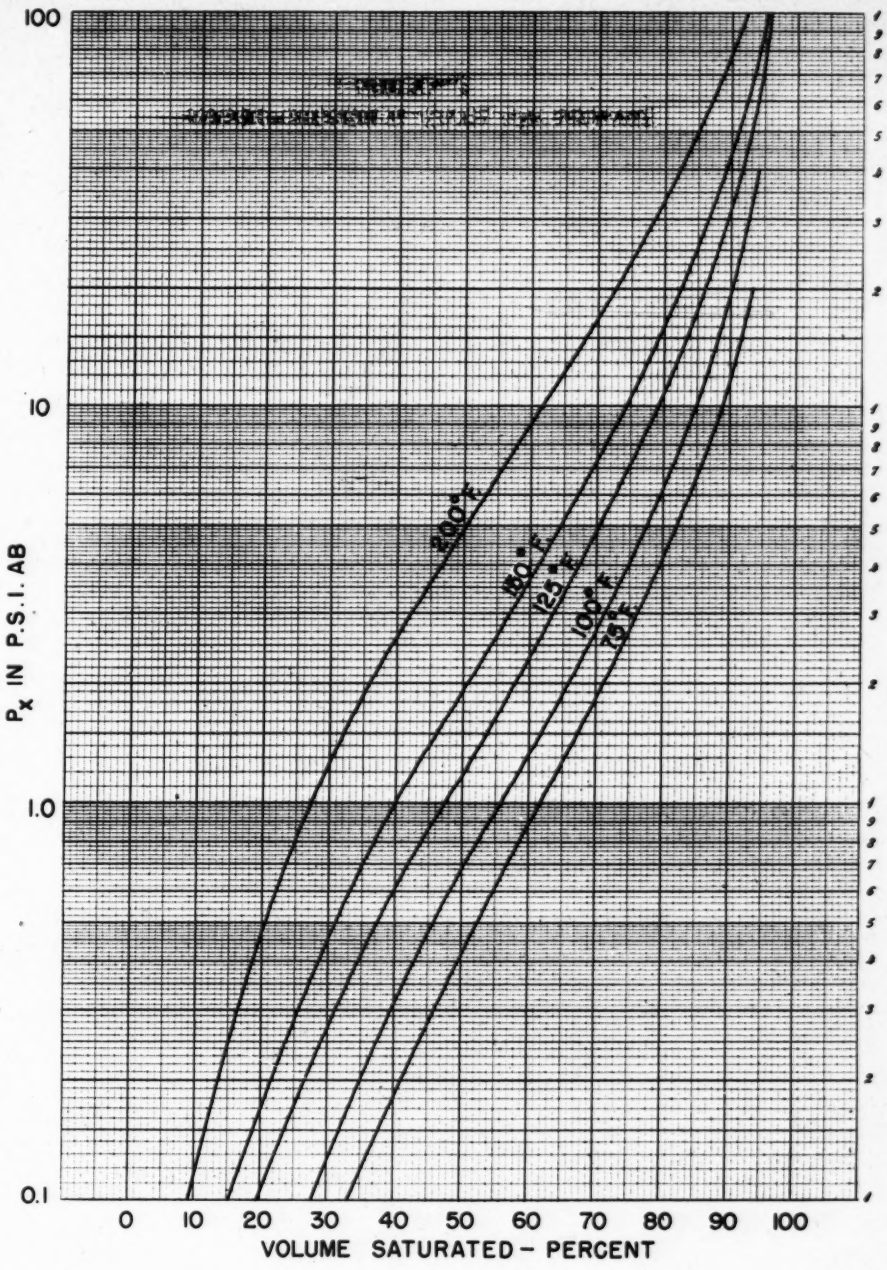

Fig. 5. Vapor pressure chart for propane.

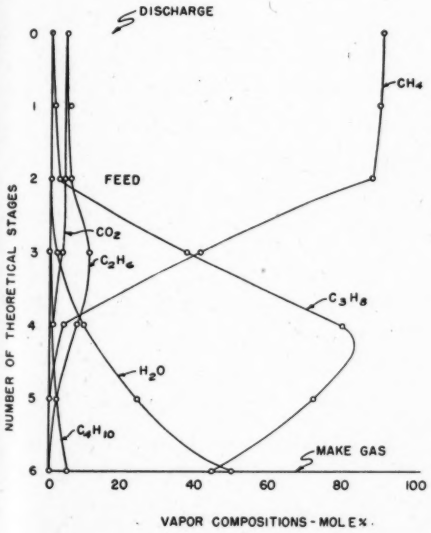

Fig. 6. Plot of stagewise calculations for separation of ethane and propane.

In *Fig. 4* is illustrated a flow control mechanism. It consists of a circular tray supported at three points and given an oscillating motion. This tray has a number of downspouts which serve as pockets for the conveyance of solids. When in one extreme of its motion, alternate downspouts of this tray are in position to be filled by the delivery tubes in the fixed tray above. These pockets do not discharge because in this position they are sealed by the tray below. As the tray moves to the opposite extreme in its travel, these downspouts pass into position over discharge holes in the tray below and are emptied.

The separation of hydrocarbons over activated carbon is a fractionation process involving the countercurrent contacting of the hydrocarbon components in two phases and is quite analogous to the conventional multi-component fractionation processes. The factors of reflux ratio, stage number, and variable molal flow of phases are of importance together with the controlling adsorption effects of activated carbon which dictate the relative volatility of the components and thereby the separations occurring in each stage of contact.

Fig. 5 presents a typical vapor pres-

Table 2. Results of the Plate-to-Plate Calculation
For Separation of Ethane and Propane in Hypersorption

Component	Feed	Discharge	Make
	Composition—Mol %		
CH_4	88.0	90.65	
CO_2	4.5	4.63	
C_2H_6	4.5	4.62	0.33
C_3H_8	2.7	0.10	89.37
C_4H_{10}	0.3	—	10.30

Feed ..... 100 mol.
Discharge ..... 97.09 mol.
Make Gas ..... 2.91 mol.

sure chart for propane in which temperature and per cent saturation of the carbon are the determining variables. The factor "per cent saturation" represents the per cent of the available adsorption volume filled by the liquefied hydrocarbon phase. In the case of hydrocarbons above their critical temperature, this term refers to the volume occupied by the high density adsorbed gas phase.

The design of a given column for the separation of hydrocarbons reduces itself to a calculation analogous to that involved in multi-component fractionation for the case of variable molal overflow, with the added variable of change in relative volatility of the components in each stage as a function of the quantity and composition of the adsorbed phase. The results of these calculations are entirely analogous to those obtained in fractionation, and for every separation there is a minimum reflux ratio and minimum number of stages required.

Fig. 6 shows the plot of stagewise calculations evaluating the separation between ethane and propane in a Hypersorption bed, feeding a lean gas stream consisting largely of methane and C_2, with heavier components being present in a relatively small quantity. The composition of the feed and production streams is shown in *Table 2.*

The pilot plant operations have shown virtually no deterioration in the activity of the carbon employed in the separations involving C_3's and lighter hydrocarbons; however, accumulations of absorption oil and polymers of heavy diolefins will cause such decline in activity. For the removal of these materials from the carbon, a reactivator is provided which operates on a split stream from the main circulation in the unit. An example of its performance is given in *Fig. 7.*

Table 3. Separation of Hydrogen and Methane
in Pilot Plant Operations

Component	Feed	Make	Discharge
H_2	52.2	Trace	100.0*
C_1	43.5	91.0	—
C_2	2.7	5.6	—
C_3	1.6	3.4	—

*Mass spectograph analysis.

Table 4. Separation of Ethylene in Pilot Plant Operations
Without Side Cutting

Component	Feed	Make	Discharge
C_1	43.0	1.6	99.1
C_{2-}	49.5	85.9	0.2
C_2	5.5	9.3	0.4
C_3	2.0	3.2	0.3

With Side Cutting

Component	Feed	Side Cut	Make	Discharge
C_1	40.1	0.5	TR	99.6
C_{2-}	18.9	32.8	0.3	0.3
C_2	37.9	65.9	1.2	0.1
C_3	3.1	0.8	98.5	TR

Attrition Losses

Attrition losses in the circulation of activated carbon in the Hypersorption unit are very low due to the free flowing nature and homogeneous structure of the activated carbon grains. An important phase of the development studies in this unit has been concerned with minimizing of impact and attrition effects on the circulated carbon. The gas lift system as employed in this unit has no curves or bends which would direct impact of the suspended solids against the pipe wall, and in the separation of the suspended solids from the gas stream, a so-called "impactless" separator rather than a cyclone is employed. The impactless separator removes the solids from the gas streams by permitting the particles to settle out by the force of gravity rather than by impact against a steel wall. In this system the loss of a fresh charge drops to a value of 0.001 to 0.002 of a per cent per cycle after the first few thousand cycles of operation, and the ultimate attrition loss rate approaches 0.0005 of a per cent per cycle.

The normal rate of attrition in a Hypersorption unit is very low. To facilitate the determination of attrition loss rates of various forms of activated carbon, attrition loss testing units are employed.

Fig. 8 presents an attrition loss curve for a typical activated carbon employed in the Hypersorption unit. Comparison of pilot plant results indicate that the mechanical treatment involved in the lift operations is the major factor contributing to the attrition loss in circulation, and the relatively slow cooling and heating effects in the Hypersorber and reactivator cause little mechanical breakage of the carbon.

Separation of Hydrocarbons

In its function the Hypersorption unit is approximately equivalent to one high-pressure, low-temperature tower. It achieves the elimination of refrigeration and compression facilities normally required for such operations and operates at the pressure level which most conveniently fits in with the attendant processing operations.

Separations in the Hypersorber have been characterized by a high degree of recovery and purity of the products.

Purification of Hydrogen

Pilot plant studies have included the separation of hydrogen from mixtures of hydrogen, methane, H_2S, and heavier hydrocarbons. Gas streams of this character are obtained from hydroforming plants and special crack-

ing operations. In the separation of hydrogen from such streams, a once-through operation is employed, hydrogen being taken overhead and methane and heavier hydrocarbons recovered as bottoms product from the unit.

High Purity Hydrogen

It will be noted in *Table 3* that very high purity hydrogen is readily obtained in this operation.

When a pilot hypersorption unit is incorporated into a hydroforming pilot plant the Hypersorber is employed to remove methane, H_2S, and heavier components from the recycled hydrogen stream to effect improved catalytic conversion. By this operation virtually no loss of hydrogen from the system is incurred in the make gas.

Purification of Ethylene

In the purification of ethylene, the Hypersorption unit takes the place of the high-pressure low-temperature demethanizer employed in the conventional plant. Normally a side cut containing the C_2 components is taken off the Hypersorption unit. Methane and hydrogen are produced as the overhead product and C_3's and C_4's are produced as the bottoms product. *Table 4* presents typical separations of ethylene obtained in pilot plant operations both with and without side cutting.

In these separations a recovery of 98% or better of the ethylene in the feed stream is usually obtained.

If the C_3 content of the feed stream reaches a high value, appreciable contamination of the side cut stream with C_3's occurs and it is preferable to use the rectified side cut operation referred to previously which employs a modified tray construction in the section below the feed point. *Table 5* presents a comparison of the separations obtained with the two types of side cutting operations on feed streams containing a high content of C_3's.

If complete removal of C_3's is desired from the C_2 fraction, a second Hypersorption unit will normally be required. If separation of the ethane from the ethylene is desired, the side cut stream is compressed and the ethylene separated from the ethane in a small refrigerated column. Gas produced in high temperature gas oil cracking will frequently show a high ratio of ethylene to ethane and further processing of the side cut stream may not be necessary.

Gas streams produced in high temperature cracking operations, or oil absorber effluent streams derived from thermal or catalytical cracking, contain low concentrations of valuable propylene and butylene difficult to recover by conventional means. The dry gas from natural gasoline absorption operations normally contains appreciable quantities of C_3's and C_4's. The pilot plant has demonstrated high recoveries of these constituents and the following table presents typical separation results obtained from absorber dry gas.

Hypersorption is in essence a physical development providing a new means for separation of hydrocarbons and other compounds. Applications have been extended beyond those separations described and range from various applications in purification of hydrogen to the recovery of natural gasoline. Some applications in the recovery of volatile chemicals and solvents have been considered. It provides a new tool for the chemical engineer in his approach to recovery and separation of extremely volatile or low concentration gases.

Table 5. Comparison of Straight and Rectified Side Cutting Operations in Pilot Plant

Straight Side Cutting Operation

Component	Feed	Side Cut	Make	Discharge
C_1	37.9	0.3	TR	99.4
C_2–	19.2	57.5	0.2	0.3
C_2	11.5	34.1	0.9	0.1
C_3	27.9	7.7	87.3	0.2
C_4	3.5	0.4	11.6	TR

Rectified Side Cutting Operation

Component	Feed	Side Cut	Make	Discharge
C_1	37.6	2.3	—	99.6
C_2–	29.9	86.6	TR	0.2
C_2	3.5	10.1	TR	0.1
C_3	28.8	0.8	99.2	0.1
C_4	0.3	0.2	0.8	TR

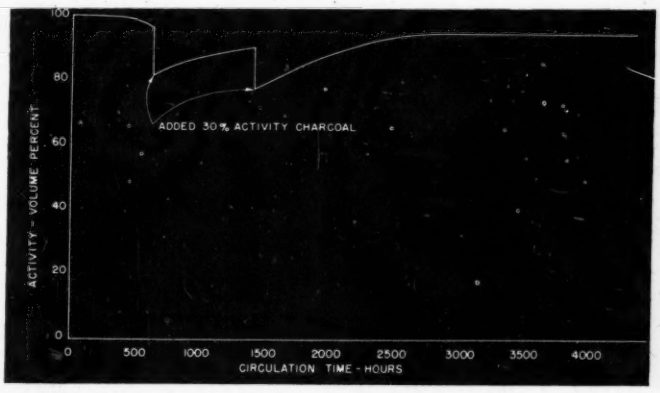

Fig. 7. Performance of reactivation unit.

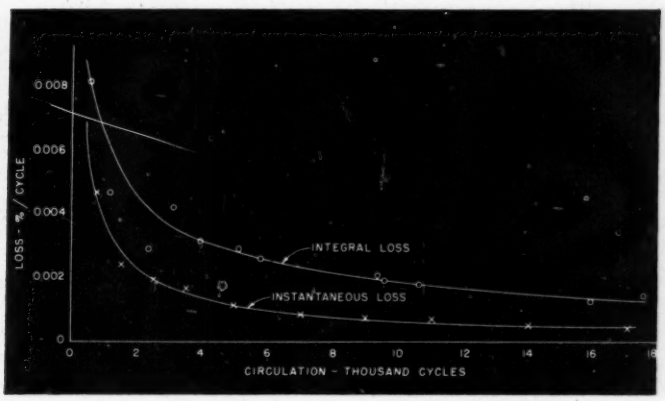

Fig. 8. Attrition loss curve for typical activated carbon.

Table 6. Recovery of C_3 and C_4 Components from Absorber Dry Gas in Pilot Plant Operations

Component	Feed	Make	Discharge
C_1	92.2	1.2	95.2
C_2	4.6	0.7	4.7
C_3	2.9	87.0	0.1
C_4	0.3	11.1	TR

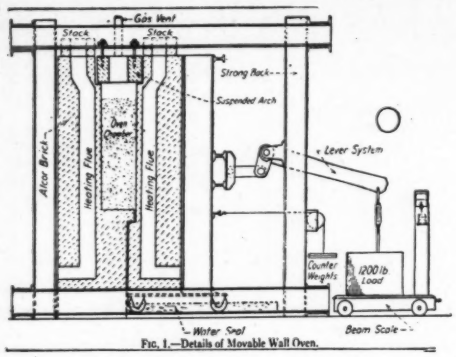

Fig. 1.—Details of Movable Wall Oven.

Movable Wall Oven

IT'S USE IN COKE-OVEN PLANT OPERATIONS

By JOHN G. SWEENEY

Assistant Chief Chemist, Brooklyn (N. Y.) Gas Co.

IT has been apparent for some time that one of the serious permanent damages to this country resulting from the late war was the depletion of its natural resources. To carry on a war there must be a terrific tonnage of steel and to make that tonnage of steel a corresponding amount of coal must be used. Although the United States has coal reserves to last for hundreds of years, many of its best coal seams are facing depletion in the immediate future. We shall have to learn to use the less desirable coals and to take the extra precautions required by their use. Coal prices alone would dictate such a procedure.

One of the most important considerations that we have to face is whether or not the use of a certain coal will cause damage to the ovens, and we have to have this information in advance. There are several types of apparatus available for this purpose and, of these, we chose the movable wall oven tester. The latter most nearly simulates the actual coking process and was a required auxiliary in all government coke oven plants which were constructed during the war period.

Gas and Coke From Coal

In order to understand the principle of the movable wall oven apparatus it might be well to discuss briefly how gas and coke are made from bituminous coal. In the process, the coal is heated without access to air. Gas starts evolving at a fairly low temperature and continues until practically all has been removed from the coke. During one portion of the gasification the solid coal melts and becomes plastic. The gas evolved in or behind the plastic envelope has difficulty in escaping and tends to generate pressures which may be of considerable magnitude. When gasification is complete, the residue, which normally weighs about 70% of the weight of the original coal, is pushed out of the oven retort as red hot coke. Quenching with water cools the coke so that it can be safely handled. The normal charge of coal for one of the Greenpoint ovens is slightly more than 14 tons, while the coke residue weighs about 10 tons. The ovens are roughly 40 ft. long, 13 ft. high, and 14 in. wide and are made of silica brick. The silica brick can stand the high temperatures satisfactorily but is liable to injury if subjected to pressures much in excess of 1 psi. The heating of the coal charge is done from both of the broad sides of the oven. These sides are hollow, rigid and immovable and the heating gas is burned inside.

Description of Tester

The movable wall tester is a small coke oven holding approximately 400 lbs. of coal. It is 12 in. wide and has gas heating flues on both sides of the coal charge similar to the heating flues of a regular coke oven. However, one wall of the test oven is mounted on rollers and is free to move out. Therefore, it is possible to know the force of pressure on the movable wall by measuring the total pressure necessary to prevent it from moving.

As a general rule individual coals are not tested separately but as constituents of blends which might be considered for use in regular plant operation. The constituents are carefully proportioned by weighing, and, after thorough mixing, the charge is dried to about 1%, or less, of water. The offtake pipe at the middle of the retort top acts as an opening to introduce the coal charge, and an outlet pipe for the products of gasification. The heating flues are kept around 2500°F in temperature and, after about seven or eight hours have elapsed, the coke is usually ready to be drawn from one end of the oven. The red hot coke is quenched as quickly as possible with water from a hose and, after cooling, the coke is ready for examination and testing for quality. During the coking period frequent scale readings are taken which tell what pressure is being developed in the oven.

We have had this tester in service for over a year now and during that period we have received a substantial number of unfamiliar coals whose safe use required preliminary evaluation in the movable wall tester. In the early years of coke-oven plant operation we seldom had more than two coals in the larry mixes which were charged in the ovens. It is normal now to have five different coals in the larry blend and we not only have to know that the blend is safe to charge but we have to be very careful in our coal handling so that we actually get the mixture that we think we are getting.

One definite advantage of the movable wall type tester is that in each run we make enough coke to enable us to test its quality and strength. In that way we can determine the coking qualities of a strange coal before we try it out on a large scale run. During the coal strike last spring, when the coal supply was desperate, we were offered a quantity of coal which was listed as coming from the Pittsburgh seam. Coal from this seam ordinarily produces a high grade of coke. Preliminary laboratory tests of the first shipment showed a doubt of the coking ability of this coal which was definitely confirmed by a movable wall oven test. Instead of producing a solid, strong coke at the end of the coking period there was nothing much more than breeze to draw out of the test retort. Subsequent runs showed that about 10% of this coal could be added to our regular mix without too much of a sacrifice in coke quality, and this is probably the way the small tonnage we received will be used up. The quality of this coal was found out in time to refuse the bulk of the order.

Modern coke ovens, such as our Greenpoint units, are capable of fast operation and excellent capacity compared with those of slightly earlier vintage, but they require constant vigilance in coal selection and preparation. The availability of the movable wall oven tester gives a little more feeling of security

Article courtesy the "Brooklyn Union Gas News."

Transportation of Natural Gas

By D. A. HULCY

President, Lone Star Gas Co.
Dallas, Texas

CERTAIN problems of a general but fundamental nature exist in the business of transporting natural gas. There is little doubt that one of the primary factors which must be dealt with in a business which transports natural gas, whether intrastate or interstate, is the one of regulation by public regulatory authority.

We must recognize and appreciate the necessity of proper governmental regulation of a business in which the public interest is so vitally involved. Rates for household use should be fixed with due regard to the costs of service, both capital and operational, and to the hazards of the business. Customers should be served without discrimination, and every reasonable control should be exercised which would tend to make service adequate and continuous. Accounting classifications should be prescribed and their use enforced in order that the pertinent facts of all phases of the business might be readily ascertainable. All securities offered for sale to the public should be subject to close scrutiny and governmental approval. The elimination of the waste of gas should be effected through the medium of laws and by means of the enforcement of regulations which should be administered by men who have an intimate knowledge of local conditions and a proper appreciation of all of the economic adjustments that a successful conservation program requires.

Managerial Discretion is Essence

Granting all this, the fact remains that in the natural gas business, more than in any other type of public service, the quickening spirit of the enterprise is to be found in the free exercise of managerial discretion in originating and in passing final judgment on those vital matters upon which success or failure so frequently depend and which so effectively differentiate the natural gas business from all other utilities subject to public regulation.

Always uppermost in the minds of those charged with the operation of a natural gas transportation system is the requirement for a fully adequate source of gas. A natural gas transportation system must have available for its use, if it is to operate in a healthy manner, sources of gas supply which may be depended upon to supply the needs of customers on a current basis, and which will provide sufficient gas over the period of time which is long enough to insure a firm basis for operation.

Customers' Needs Uppermost

What the transporter of gas is concerned with primarily is a supply situation which is healthy from the standpoint of his system and its customers, regardless of whether circumstances have required him to become a producer of gas in one or more of the fields from which he takes gas. In many instances the transporting company depends upon fields where both it and other producers own wells and have made substantial investments in producing property. It is decidedly the primary desire of the transporter that such a field, as a whole, should be so operated and maintained that the greatest amount of gas will be recovered therefrom. This desire—and self-interest, if you please—should, and in most instances does, cause the transporting company to forego special temporary advantages in producing its wells when the overall and long range welfare of the field requires this action.

Two problems confront the transporter of gas in regard to his source of supply, and although these problems may be classified as production problems they, nevertheless, are serious and fundamental in the business of transporting natural gas. The first of these arises in connection with the proration of gas production in various fields. The process of proration has developed to a considerable degree and there is little doubt that the proration of gas withdrawals among wells and leases within an individual field will become more and more the general practice until it is universal. There are two worth while objectives to be achieved by a proper proration procedure within a field. One of these objectives is to cause the field to be so operated that it will produce the greatest possible amount of gas. The second objective is to achieve, consistent with the first objective, the distribution of withdrawals among various properties in the field on a basis which will protect the correlative rights of owners in the field.

It is necessary in the achievement of each of these objectives that a field be completely developed on a reasonably uniform basis, but this fundamental consideration has received heretofore less attention than it deserves. To be more specific, the spacing of wells within a field is usually controlled by the effect of a proration formula rather than by any specific spacing regulations. A proration formula should be devised and applied in such a way as reasonably to assure the complete development of the field within a reasonable length of time on a well spacing basis which is as uniform as possible. If this is done with due consideration to the economic factors which control, we will see in the future fewer and fewer fields with areas which remain undeveloped throughout the life of the field causing underground waste of gas. Also, we will see fewer owners who fail to realize income from properties which would be productive if they could be drilled.

Close Spacing Wasteful

It would be far better for wells to be spaced too widely in the early life of a field in order to insure complete development on a uniform basis than to space the early wells too closely at the cost of leaving portions of the field undeveloped forever. There have been cases where fields were never fully developed because of an initial spacing pattern which placed wells too close together, and in these cases gas was

Abridgment of a paper presented at the November meeting of INGAA.

or will be left underground not subject to recovery. In such cases, pertinent questions might be: "Whose correlative rights are being protected? Have we not forgotten the owner who fails to obtain production because economic limitations and initial well spacing which is too close have made complete development impossible?"

Finally, if an initial wide spacing program fails to provide a sufficient number of wells after complete development has been achieved on that pattern, additional wells can be drilled, but unfortunately no method has yet been devised for moving wells when it happens, in a particular case, that the initial spacing pattern is too close to achieve complete development under the economic situation which exists in the field.

Venting Casinghead Gas

The practice of venting casinghead gas has received a considerable amount of attention in various quarters in recent times and scarcely less attention has been devoted to measures to reduce the amount of this venting by means of gas transporters taking and utilizing this gas.

There is no doubt that the gas transporter may utilize this gas under proper circumstances and that it is to his advantage to do so. But in much of the discussion which has been had about means of persuading or requiring the transporter to take casinghead gas, there has been a tendency to forget that this gas belongs to the producer and is vented by him as a pure incident to the production of oil, which is the matter of primary concern to him.

It is frequently the case that the producer is willing to make his casinghead gas available only on a basis which will in no wise alter his oil producing procedure, presently used or anticipated for the future. The result of this situation is that the producer usually feels that the adaptation of his operations to the requirements necessary to permit the transporter to take the gas is unreasonable and unprofitable to him; and that it is the duty of the transporter alone to fit his operations to the existing circumstances. On the other hand, there may exist in the attitude of some gas transporters an apparently unjustifiable degree of resistance to the taking of casinghead gas.

The one approach to this problem which offers a rational solution in a healthy manner is the one wherein both the producer and transporter recognize that a joint problem exists—a problem which may be jointly solved in many instances to the mutual benefit of the parties involved. It is absolutely necessary, however, that the joint approach to a solution be undertaken with a full realization on the part of the producer of the transporter's situation and operating requirements, and, conversely, the transporter must be aware of the operating requirements of the producer. In any case, there should be some adjustments on each side of the proposition, and these should be undertaken in good faith with a full realization of the mutuality of the deal and of the benefits which will accrue to both of the parties.

The essence of the casinghead gas problem is that it is not a question of the oil industry versus the gas industry, but that it is in fact a problem for both. It is a problem which by long odds should be solved by petroleum industry action without the imposition of rigid regulatory formulae.

Oklahoma Commission Sets Minimum Well-Head Price at Guymon-Hugoton

By O. D. HALL

AN order of the Oklahoma Corporation Commission, which fixed a minimum price of seven cents per Mcf on natural gas at the well-head at a pressure of 14.65 psia effective Jan. 1 applying to the Guymon-Hugoton gas field of Oklahoma, may have far-reaching effects throughout the Mid-continent area.

The order followed a series of hearings before the commission, and originated with an application of the Peerless Oil & Gas Co., which sought an order to require Cities Service Gas Co. to connect with two of its gas wells in Sec. 8 and 5 of Township 4 of Texas county, Okla., and take gas offered at 6 cents per Mcf. Later, the Texas County Royalty Owners Association, holding gas leases on about 100,000 acres, and the Oklahoma School Land Commission, holding 30,180 acres of oil and gas leases on state lands, intervened and joined Peerless in asking that the well-head price of gas in the field be fixed generally at 10 cents.

The Oklahoma Corporation Commission in its order held that the Cities Service Gas Co. should connect to the two wells of Peerless and take gas ratably from them subject to paying the 7 cents price if sustained, and that this price should apply to all gas sold at the well-head throughout the Guymon-Hugoton field. Prevailing prices paid in the field prior to the order ranged from 4 to 5 cents per Mcf, based on a well-head pressure of 16.4 psia.

Bases for Decision

In its order the commission held substantially as follows: Production of gas in the Guymon-Hugoton field is in excess of market demand; all wells are drilled into a common source of supply; Cities Service Gas Co. is a large buyer and seller of natural gas in the field, taking gas from more than 50 persons and corporations; by reason of its position it has been able to "dictate the price, measurement, and terms of taking and marketing of natural gas in the Guymon-Hugoton Natural Gas field;" and "producers without a connection have been required to accept the price, measurement and terms offered by operators of properties in said field or shut down their wells."

As a result, the order proceeds, natural gas is being taken out of the field at a price "far less than its actual fair market value and at a price far less than the value of natural gas for heating and other purposes, compared to the value of other fuels." Cities Service is taking more than its proportionate share of gas from the field, the order asserts, and it is a common carrier, common purchaser and a public utility subject to regulation, as to prices and practices, by the commission.

Economic and Physical Waste

The order finds further that the taking of gas at present prices constitutes both economic and physical waste of a great natural resource, resulting in great loss to royalty owners and to the state in gross production taxes.

These findings are contrary to contentions of the Cities Service Gas Co.'s attorneys in the hearings. They claimed that prices being paid by Cities Service in the field, which averaged 4 cents at the well-head and 4½ cents delivered into its gathering lines, constitute the fair prevailing price throughout the field; that it has no monopoly in the field because several other companies are purchasing natural gas there on a competitive basis; that the commission has no jurisdiction over it because it is not a public utility and because it purchases gas which is delivered into and transported through interstate pipe lines, and that a higher price fixed in the field for gas would constitute a burden on interstate commerce and ultimately bring an increase in cost of gas to consumers.

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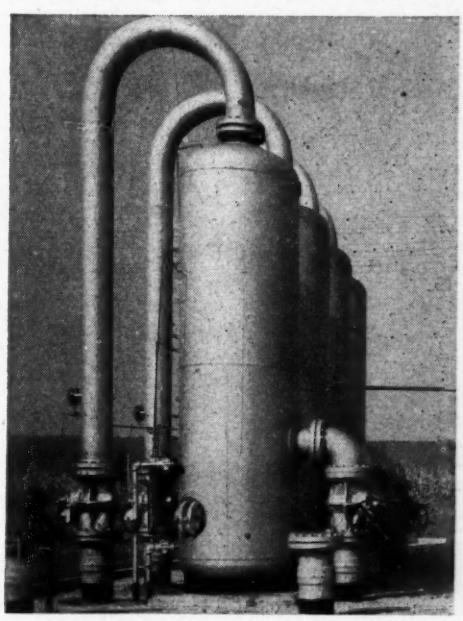

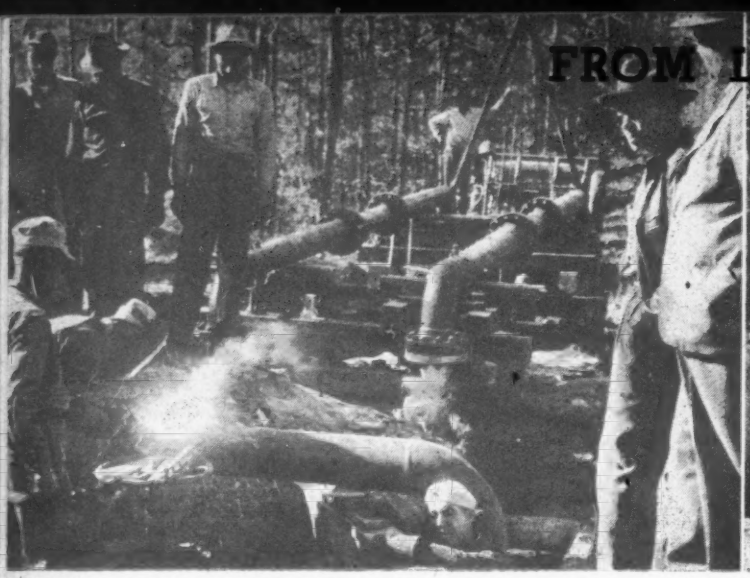

Welders complete final tie-in of the Little Big Inch with T.G.T. system near Natchitoches, La.

The needle swings over to indicate start of flow of Texas gas from Natchitoches to the fuel-hungry East.

Texas Gas Flows Through The "Inches"

AT 45 minutes past noon, Dec. 5, Tom Evans, district superintendent for Tennessee Gas and Transmission Co., turned the big valve at the juncture of Tennessee's line and the Little Big Inch near Natchitoches, La., and natural gas from Texas started its long journey to Ohio. Less than 72 hours had passed since the company had been notified from Washington that its bid for interim operation of the lines had been approved.

The lines immediately began receiving at the rate of 50 MMcf per day, a figure which was expected to be trebled before long.

Several hours later, near Little Rock, Ark., the gas flowed through into the Big Inch, and at 3:30 p.m. on Monday, Dec. 9, it reached its delivery point, north of Cincinnati, Ohio. At almost the same moment, the first head of gas was being sent into the Big Inch at Longview, Texas, and was on its way to the termini in Ohio.

Three tie-ins were made at the Ohio end with lines operated by the Ohio Fuel Gas Co., Columbus: Line K-30, five miles northeast of Lancaster, which is a 16-in. line extending from Crawford station to Treat station, at Homer; an 18-in. line, three miles north of Monroe, to serve Cincinnati; and a 16-in. line at Hooker, to serve Columbus.

Tennessee Gas and Transmission, which was not one of the bidders on the line when applications were opened last summer, was awarded the interim contract because, according to Interior Secretary Krug, it was the only concern having supply, organization, and outlets ready for immediate use. Under the terms of the FPC-approved plan, the company will use the lines for a minimum of 120 days, and will pay the government a rental of 6 cents per Mcf of gas transported, plus maintenance costs.

Tennessee Gas had at the time operation of the lines started sufficient reserves to supply the 50 MMcf per day input. For added volume sufficient to build up to the projected 150 MMcf, the company negotiated for 70 MMcf of Carthage field gas, and for additional gas from other sources.

Pipe Lines Foreman Webster Strous, Ohio Fuel Gas Co., points out features of the regulator at K-30 line to Line Foreman Dewey Mathias.

Emanual Ogg, repairman-in-charge, tests valve on K-30 tie-in near Lancaster.

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Every part of every model in the Consolidated Gas Burner line has been developed with these objectives in mind: compactness of design, maximum ease of installation, freedom from service worries, top burning efficiency.

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Manufacturers of Automatic Heating and Low Temperature Freezing Products for Home and Industry

Gas-fired hot water quickly cleared the snow from this driveway in Pittsburgh, Pa., after a storm, leaving it dry and safe for trouble-free use.

HOW TO INSTALL SNOW MELTING SYSTEMS

Some successful operations are described, and techniques for making installations are discussed.

By ERNEST A. DENCH

A non-patented snow melting system gives the gas company the opportunity to sell an outdoor extension to the existing heating plant.

The prospects for such installations, in the order of their importance, are as follows: industrial plants, commercial establishments of all types, institutions, professional men, and suburban home owners in the middle-to-large salary brackets.

The advantages to be presented to these main groups of prospects include:

1. **Keeping truck or passenger car driveways, delivery docks, private parking lots, and sidewalks clear and dry during the winter months.**
2. **Elimination of physical effort.**
3. **Reduction in seasonal accidents. One-third of cases of slipping on snow or ice surfaces are fatal, according to the Kentucky State Department of Health. Even non-fatal accidents (broken bones, sprains, etc.) amount to approximately double the number of pedestrians knocked down by automobiles.**

The problem which one industrial firm faced in previous winters was to keep its truck driveway entirely clear of snow and ice. This driveway, 80 ft. long by 8 ft. wide, originally had a black top. When such common melting agents as rock salt and calcium chloride were applied, this black top tended to disintegrate because of continuous use by heavy trucks. This black top was replaced with concrete slab when a snow melting system was installed. In addition to being a better heat conductor, this concrete slab provides a better wearing surface for the heavy traffic.

The requirement which had to be met was that, with an outside temperature of zero, the concrete slab maintain a temperature of 55° F.

The driveway was dug to a depth of 6 in. to fit the pre-determined thickness of the slab.

One and one-quarter in. wrought iron pipe was welded into a continuous coil, spaced 4 ft. on center. The piping was laid in sand-filled trenches, graded to provide a constant drain in coils as close as possible to the underside of the slab.

Felt Strips Used

To prevent any physical connection or contact between the coils and the concrete, building felt strips, 18 in. wide, were placed over the length of the piping.

There was also a 6 x 6 in. wire mesh reinforcement near the bottom of the overall slab. A wire mesh strip, 18 in. wide, was run near the top of the slab and directly over the piping.

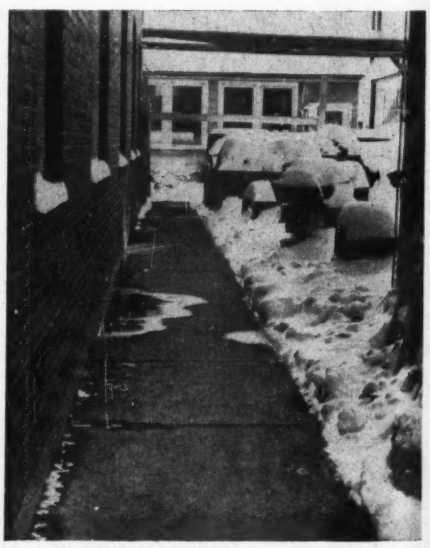
The coil was connected to a low-pressure exhaust steam line, and simply trapped at the end in an already-present areaway drain. The latter now carries off the melted snow and takes care of the condensate from the coil.

And what of the results? Between Dec. 8 and Feb. 15, there was a snowfall of approximately 120 in. in this firm's area. Both earlier and later in the winter there were rainfalls and sleet storms. Under lowering temperatures of night and early morning hours at this season, this firm's driveway would have been a sheet of glaze—a condition avoided by turning on the steam Nov. 1 and keeping it going until late March.

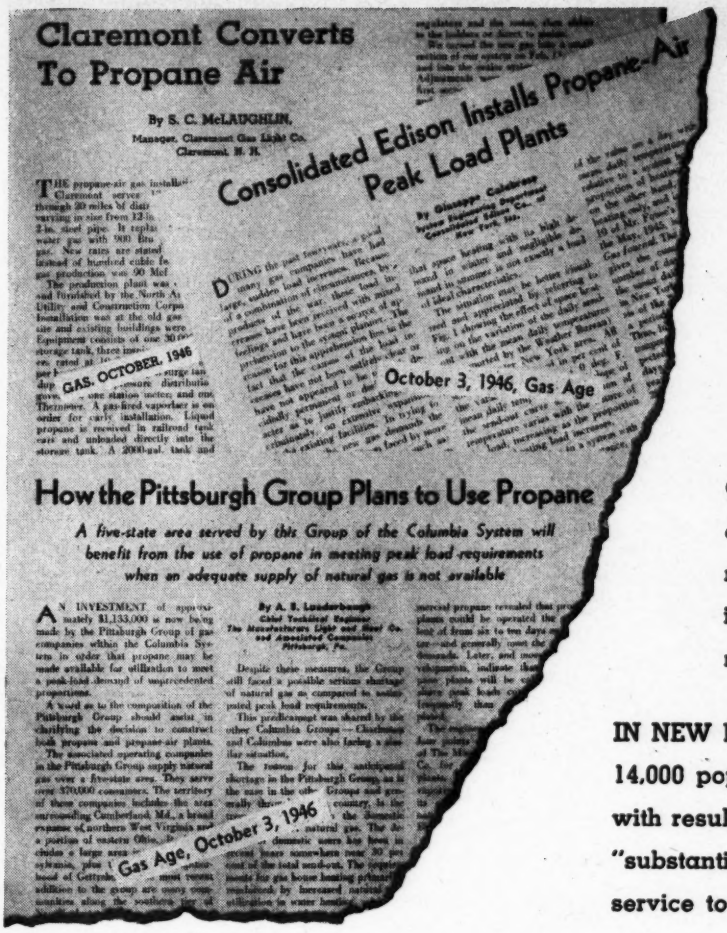
With the heat on continuously, it was impossible for slush to form. The snow melted on coming in contact with the warm slab.

The outdoor extension of this company's radiant heating system cost $1200. This covered the concrete slab and also the coil, and all the labor in connection with both. It is expected, with normal maintenance care, to last from 10 to 15 years without replacement.

A smaller installation, as successful as the one just described, was made under the driveway of a suburban residence in Pennsylvania.



Walkway between factory buildings and plant cafeteria at Sarco Mfg. Co., Bethlehem, Pa., after a 14-in. fall of snow. Dampness remained only in spots where refuse was thrown carelessly.



Claremont Converts To Propane Air

By S. C. McLAUGHLIN, Manager, Claremont Gas Light Co., Claremont, N. H.

THE propane-air gas installa... Claremont serves ... through 20 miles of distr... varying in size from 12-in. ... 2-in. steel pipe. It repla... water gas with 900 Btu ... gas. New rates are stated ... instead of hundred cubic fe... gas production was 90 Mcf ...

The production plant was ... and furnished by the North At... Utility and Construction Corpo... Installation was at the old gas ... site and existing buildings were ... Equipment consists of one 30,0... storage tank, three inter... ers, rated at ... per h... duty ... surge tan... ... one station meter, and one ... Thermostat. A gas-fired vaporizer is on order for early installation. Liquid propane is received in railroad tank ... cars and unloaded directly into the storage tank. A 2000-gal. tank and ...

GAS, OCTOBER, 1946

Consolidated Edison Installs Propane-Air Peak Load Plants

By Giuseppe Calabrese, Station Engineering Department, Consolidated Edison Co. of New York, Inc.

DURING the past four years, of many gas companies have had large, sudden load increases, because of a combination of circumstances, by-products of the war. These load increases have been received with mixed feelings and have been a source of apprehension to the system planner. The reason for this apprehension lies in the fact that the causes of the load increases have not been sufficiently understood or appreciated to be ... with any degree of confidence as to ... expansion ... In trying to ... the ... existing facilities. In trying to ... the new ... demands ... such as ... caused by ...

October 3, 1946, Gas Age

How the Pittsburgh Group Plans to Use Propane

A five-state area served by this Group of the Columbia System will benefit from the use of propane in meeting peak load requirements when an adequate supply of natural gas is not available

By A. B. Lauderbaugh, Chief Technical Engineer, The Manufacturers Light and Heat Co. and Associated Companies, Pittsburgh, Pa.

AN INVESTMENT of approximately $1,133,000 is now being made by the Pittsburgh Group of gas companies within the Columbia System in order that propane may be made available for utilization to meet a peak-load demand of unprecedented proportions.

A word as to the composition of the Pittsburgh Group should assist in clarifying the decision to construct both propane and propane-air plants.

The associated operating companies in the Pittsburgh Group supply natural gas over a five-state area. They serve over 370,000 consumers. The territory of these companies includes the area surrounding Cumberland, Md., a broad expanse of northern West Virginia and a portion of eastern Ohio, ... includes a large area ... systematic, plus ... hood of Gettysburg, ... most recent additions to the group are among communities along the southern tier of ...

Despite these measures, the Group still faced a possible serious shortage of natural gas as compared to seasonal peak load requirements.

This predicament was shared by the other Columbia Groups — Charleston and Columbus were also facing a similar situation.

The reason for this anticipated shortage in the Pittsburgh Group, as in the case in the other Groups and generally throughout the country, is the ... natural gas. The ... domestic users has been in ... years somewhere near 30 per cent of the total send-out. The ... month for gas house heating primarily ... by increased natural ... utilization in water heating ...

Gas Age, October 3, 1946

We Read

in our Gas Trade Magazines . . .

Every Month

Of gas plants that are changing to Propane-Air or installing standby or peak-load equipment to meet the rapidly-growing demand for this most ideal and economical of all cooking, heating and refrigerating fuels — G A S.

IN NEW HAMPSHIRE it is a water-gas plant in a town of 14,000 population that has been converted to Propane-Air with results that "have been very satisfactory." as well as "substantial savings in production costs plus improved service to our customers."

IN NEW YORK CITY, one Propane-Air "peak-load" plant has been installed and another is in course of construction to provide "low cost peak-load capacity supplementing existing plants during the cold winter season," as well as "to avoid starting peak-load plants of the conventional type during the milder seasons, when gas required is within the limits of capacity and interchangeability of the Propane-Air plants."

IN THE PITTSBURGH GROUP of natural gas companies, FIVE PROPANE-AIR plants will be completed this year with a total daily capacity in equivalent natural gas of 30 million cubic feet. These installations have been made despite the fact that this organization, a big natural gas producer, is also a heavy purchaser of gas from the Southwest, and operates vast underground gas storage facilities.

PEAK-LOAD CAPACITY PLUS PRODUCTION ECONOMY

seem to be the primary reasons for these changes and installations. Equally as important are PLANNING, DESIGNING and BUILDING "KNOW HOW."

We therefore invite consideration of your problems, without obligation on your part, confident that our years of experience in the fields of LP-Gas Service and Equipment design and construction will result in mutual satisfaction and profit.

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The private drive-in distance from the shoulder of the public highway to the garage is 110 ft. It is a down grade to the garage, in the vicinity of which (up against the doors) snow and ice clung long after the nearby street surfaces were clean and dry.

This private driveway had two concrete strips, each two feet wide, for one-way traffic. For the snow melting system, these concrete strips were removed and replaced. Under each concrete strip, on beds of black top, are now two wrought iron pipes, 1¼ in. in diameter, 8 in. apart. The four pipes on the two concrete strips converge on the public sidewalk, thus circulating the hot water back and forth. The source of the heat is a gas-fired hot water heater (instantaneous) in the garage. As the system is operated intermittently, anti-freeze is added to the water in the tank. This snow melting system, including driveway alterations, cost $500. Costs to date have been for gas fuel. Such bills have not amounted to much, to judge by the thawing of a 15-in. snowfall within two hours for a gas consumption cost of 60 cents.

Workmen site-weld the snow-melting lines under a driveway for a commercial installation in Buffalo, N. Y.

Installation Techniques

The technique of melting snow from outdoor exposed surfaces is relatively simple. It requires the circulating of steam or hot water from the plant boiler house into a network of pipes of pre-determined size. The pipes are located 3 ft. apart. A practicable circuit at present is 1000 ft.

Each circuit requires an underground heat exchanger. Here the steam is converted into hot water, and then pumped down the pipes. A hot water temperature of between 40° and 45° will melt the snow.

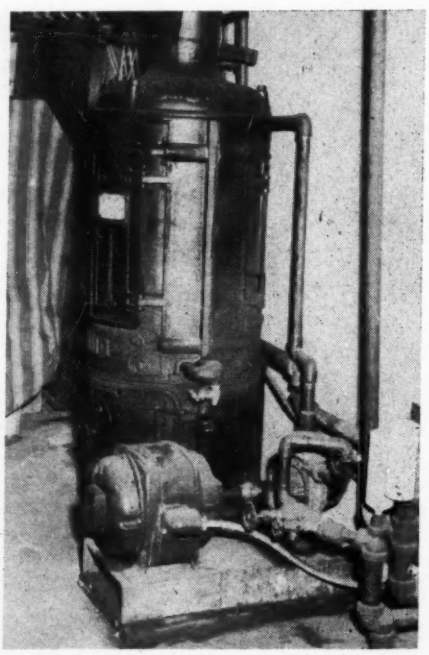
To Dig or Not to Dig? Facts given thus far emphasize that a snow melting system functions from *beneath* any outdoor surface. While this is true, an expensive and prolonged digging operation is not always necessary. A practicable alternative involving less expense is to *elevate* the existing surface. The pipe can first be spread over this existing surface, and then covered with new concrete or black topping.

Scheduling the Heat: Another question likely to arise with a snow melting system is *when* to turn on the heat. Custom among the pioneer users to date has varied, and each method tried has advantages and disadvantages.

Should the heat be kept turned on during all the months snow is predictable, steam gives the best results.

When the system is active only when a snowstorm is in the offing, or there has been rain followed by a heavy drop in the temperature, causing ice to form, a combination of hot water and anti-freeze liquid is advisable.

The disadvantage of using the system intermittently is that, when the plant is closed, there may be a heavy snowfall. Unless the night watchman is instructed to watch out for such climatic changes, precious morning work hours may be lost melting the snow and ice accumulated outdoors.



Instantaneous type gas-fired water heater, located in the garage, which is the source of hot water used in snow melting system installed under driveway at Pittsburgh (Pa.) residence.

To overcome this disadvantage, one plant user has developed an electric system of automatic control. When snow or ice weighs down on a metal plate suspended for this specific purpose, it makes an electrical contact with the circulator—and, like magic, the heat starts to flow underground.

A practicable compromise between constant and intermittent heat is, as another user discovered, to lower the temperature of the circulating water when the outdoor temperature does not indicate snow. This plan keeps the pipes warm, so when there is a snowfall, during which the heat is turned on full, there is not much chance for the snow to accumulate. The easiest way to keep a snowfall under control, from a melting standpoint, is during the *first* hour.

The relatively few snow melting system installations made to date have been geared to a melting pace of 1 in. of snow per hour. Although snow does fall faster than this on occasion, the U. S. Department of Commerce Weather Bureau has no such data.

Last winter one firm had three snowfalls each of from 11½ to 14½ in. The latter fall was, in addition, quite a pacemaker, making two and a fraction inches per hour. Naturally, the snow melting system fell behind. After the snowstorm had exhausted itself, there was a 6-in. accumulation on the driveway. It took six hours to melt it.

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LOS ANGELES

GAS' Digests

Report of Subcommittee on Use of Oxygen in Gas Manufacture

Presenting the final three of 10 abridgements of papers presented at A. G. A. convention, Atlantic City, N. J., Oct. 7-11, 1946. Continued from last month.

By L. L. NEWMAN

Bureau of Mines
Subcommittee Chairman

IN addition to the material presented in the selected bibliography in the subcommittee's first report and in Progress Report No. 2 on Project CPR-5B, considerable literature has been added on oxygen production and its utilization in gas production as a result of the investigations sponsored by the National Defense Research Council of the Office of Scientific Research and Development, and of the Technical Industrial Intelligence Committee and the various military and naval missions. The following conclusions are based on some of the material which has been declassified in time for presentation in this report, and on material supplied for limited use by manufacturers of equipment relating to this subject:

1. It may be taken for granted that the technical phase of gasification of fuel with oxygen will be solved with perhaps no greater difficulty than was encountered when a large portion of the manufactured gas industry converted from the use of gas oil to heavy oil for carburetion. The successful operation of the oxygen gasification processes in Europe and on this continent may be taken as the basis for this conclusion. This does not mean that the processes which have already been developed should be adopted by any individual plant without additional critical examination to determine how they may be best fitted to the local fuel and power supply and other conditions.

2. Gas produced by the use of oxygen must be considered as a base load proposition. There is no flexibility in the output of the air separation plants as presently known: the amount of oxygen available will determine the total amount of gas which can be produced with its use in any given process; and the indicated investment costs will definitely limit the amount of standby oxygen equipment.

3. For public utility distribution the gas produced by the use of solid fuel and oxygen will have to be enriched. The amount of enrichment will vary with process: thus, gas from a high-pressure gasification process will require less enrichment than from a normal pressure process, but there will be no escape from the problem of enrichment if present standards are to be maintained.

   The means of enrichment, which may consist of methanation of the blue gas, carburetion with oil gas which may also be produced by the use of oxygen either in the same or in separate generators, or mixing with liquefied petroleum or natural gas either as received or partially cracked, are not within the scope of this subcommittee's inquiry.

4. There is sufficient evidence that oxygen costs will be low enough to justify its use in gasification. The use of oxygen makes it possible to gasify relatively low cost fuels which are not suitable for intermittent water gas generators. Even with the expensive fuels now generally consumed the use of oxygen may permit the replacement of the complicated cyclic water gas operations with the relatively simple continuous producer gas operation, because of the economies resulting from the increased fuel efficiency and capacity and the decreased labor costs.

Small Street Opening Method In Distribution Maintenance

By E. F. SCHULDT

Peoples Gas, Light & Coke Co., Chicago

The extensive rehabilitation and system improvement program we started in 1935 was directed toward the renewal of leaking services; the retirement of stubs and services not in use, whether leaking or not, and the retirement of duplicate mains not required for capacity. The service rehabilitation and retirement program completed since 1935 has been accomplished almost entirely by using the small opening method.

The small opening method, or 1 x 1 work, takes its name from the one square foot pavement opening which is used in the execution of the work. Long handled tools have been developed with which the work is performed by men working above the pavement. Some of the advantages of the small opening method are as follows:

1. Repaving of the 1 x 1 opening is less expensive than the cost of repaving of a large opening. Prior to 1936, when all of our street work was completed in 2 x 4, or larger, street openings, we paid a minimum of $15 for repaving. The current contract price for repaving a 1 x 1 opening is proportionately smaller.

2. Small opening work is completed with the backfill done so effectively that the opening is ready for immediate repaving without danger of delayed settlement and with absolutely no hazard to traffic from delay in repaving. This type of operation has resulted in improved public relations and has official public acceptance.

3. Less heavy digging work is required

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SO. CALIFORNIA'S No.1 GENERATING PLANT

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1. The generating capacity of this plant is 25,000 MCF per 24 hours, and it was used as a STAND-BY PLANT to take care of the gas supply of the city of Los Angeles.

2. Designed to produce gas from crude oil, we can now offer this ultra-modern plant in its entirety, or any part thereof, at a fraction of its original cost.

GAS GENERATORS

12—22' dia. x 35' high, riveted steel plate shells, with Critchlow valves.
24—Wash Boxes, 11.50 dia. x 25.75' long, riveted steel plate shells.

SCRUBBERS

6—20' dia. x 60' high, riveted steel plate shell.
5—15' dia. x 60' high, riveted steel plate shell.

AIR COMPRESSORS

2—Laidlaw-Dunn-Gordon type-cross compound, 2-stage, air and steam cylinders tandem, cylinders HP 13" x 14" LP., 22"x 18" stroke, steam-inlet 3" with 7" exhaust.

BUILDINGS

Engine Room Building: Structural steel frame, approximately 70' x 90'.
Generator Building: Structural steel frame, approximately 100'x200'.

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Hundreds of valves, gates, globes, checks from 1" to 42". Thousands of tons of pipes and fittings of all description.

35 PUMPS

Of All Description

- Steam Duplex
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- Electric Driven
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- Compound Duplex—Double Acting

All Makes

- Fairbanks-Morse
- Byron Jackson
- Smith-Vaile
- Union
- Manistee
- De Laval
- Wheeler

and many others

FOR EXAMPLE

"Union" single stage, cent. 6" suction, 5" discharge, 2000 RPM, 70' head, 900 GPM.

Driven by a 25hp single stage, farm 3-A solid type, "Kerr" steam turbine, 2000 RPM.

"Layne & Bowler," size 12", 6 stage, elec. driven, cent., deep well type, 8" horizontal flanged discharge, Model A-1914, 125' head, 1500 GPM, 1120 RPM.

Motor—"Westinghouse" 35 HP, 3, 60 cy. 440 Vo.

"Fairbanks-Morse" duplex, steam driven, size 10"x6"x12", 235 GPM.

"DeLaval" 2 stage cent., 5" suc. 4" disch. 500 GPM, 405' head at 3000 RPM, type 2-P-5.

Driven by a "DeLaval" steam turbine, type NC, 3000 RPM, 4" intake, 10" exhaust.

"Wheeler" size 6, sgle. stage, horizontal, double suction, 1800 RPM, 750 GPM, 60' head.

Driven by a "Terry" type Z1 steam turbine 45HP, 1800 RPM.

For further information, call or write

EXHAUSTERS

2—Ingersoll-Rand turbo, 3200 RPM, disch. press. 2.5# sq. in., capacity 16,700 cu. ft./min. at 14.7 abs. DRIVEN BY: 275 HP Terry steam turbine, 3300 RPM.
1—Roots style #7, 16" suction and disch., capacity 93,600 cu. ft./hr., 120 RPM. DRIVEN BY: "Oil City" 20 HP sgle. cyl. vertical steam engine, size 9" x 9".

BLOWERS

3—steam turbine driven "Sturtevants," 27,800 cu. ft./min., 250 HP "De-Laval" steam turbine, 5500 RPM, including reduction gears.
3 "Sturtevants," 35 to 40M ft./min., 2-powered by "DeLaval" 4-stage steam turbine, 300 HP, including reduction gears, 1-powered by 400 HP 3 ph. 60-cycle, 2300V, 1800 RPM "Fairbanks-Morse" motor w/starters, etc.

FEED WATER HEATER

"Cochrane" series O-24000, V-Notch type O-24330, capacity 330,-000# of water/hr.

PLANT WRECKERS

1980 HILLHURST AVE., LOS ANGELES 27 • NO. 1-1126

in small opening maintenance. It is simple arithmetic to figure out that eight times as much dirt must be removed and replaced from a 2 x 4 opening as that removed from a 1 x 1 opening. In these days, when labor objects to strenuous laboring work, any method by which arduous digging can be reduced surely merits consideration.

4. The larger proportion of mechanical, semi-skilled work, required in small opening activities has made this work interesting and has provided opportunities to the workmen for advancement above the laboring grade.

5. The work can be done more rapidly in an emergency, and men working on a gas leak work out of a gas atmosphere without the necessity of a gas mask. No headaches develop in 1 x 1 work because of "too much gas."

6. Small opening work is precision work and has resulted in more careful planning and execution by the street crews. A 1 x 1 opening must be located at exactly the right spot to be effective. The incidence of wasted work on unproductive street openings has been reduced to a minimum.

7. The overall labor cost is less.

Evaluation of Enriching Oils

S. P. CAULEY

Socony-Vacuum, N. Y.

IN general it appears that the enriching value of an oil depends upon its general composition, volatility, and the concentration of extraneous substances such as sulphur and nitrogen compounds. The general composition, or relative paraffinicity, appears to be the most important factor.

The relative paraffinicity of an oil can be most easily shown on the basis of its gravity-viscosity relationship.

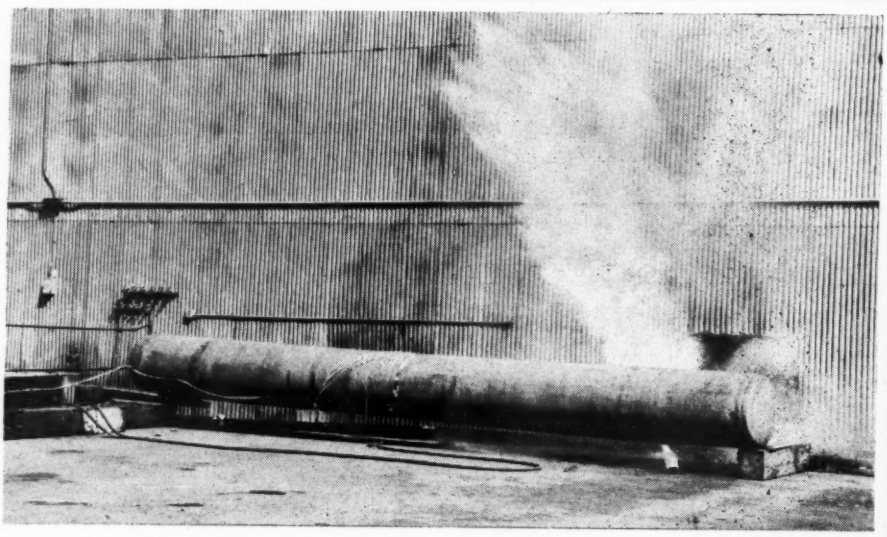
A correlation of viscosity-gravity relationship of an oil to its enriching value has been shown which may be of use in preliminary studies of various oils being considered in gas manufacturing operations. However, in view of the possible influence of variables previously mentioned, it is felt that actual cracking tests should be the real criterion of the value of any oil.

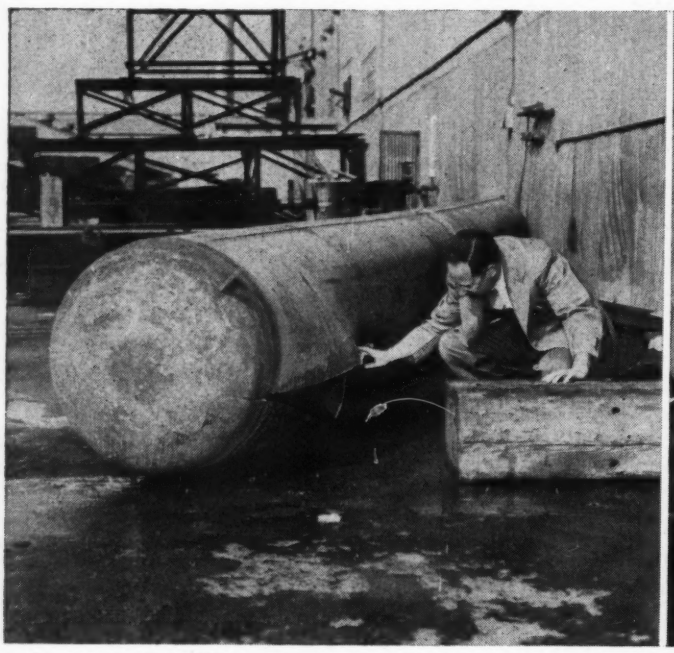
The arbitrary writing into specifications of paraffinicity, sulphur, and nitrogen limits might easily lead to an increase in cost of gas enriching oils without a corresponding benefit in gas enrichment value.

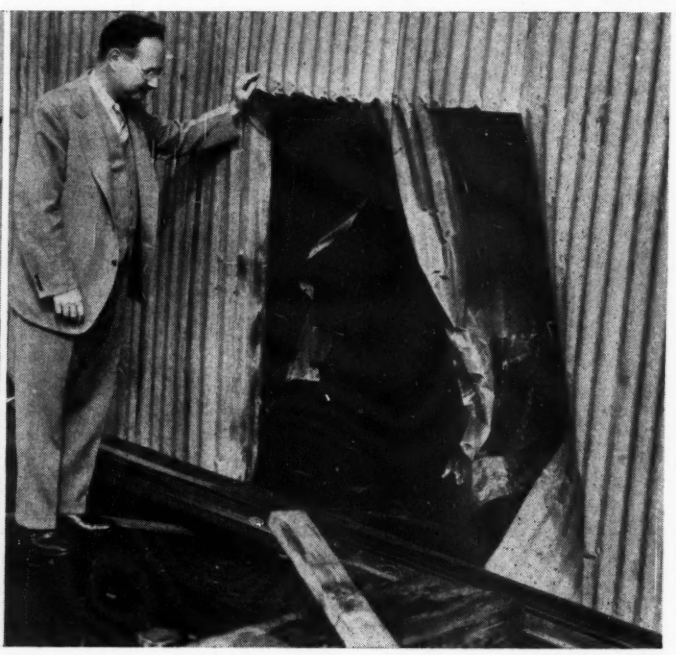
TESTING "BIGGEST INCH"

A length of pipe of the 30-in. variety being used in construction of the Texas-to-California line recently underwent a pressure test. Sealed at both ends, the pipe was filled with water to the bursting pressure. At 1800 lbs. the pipe bulged and split near one end. Water gushed high into the air, and its lateral force tore a gaping hole in the wall beside which the pipe had been placed.

Fabricator of the pipe is Consolidated Steel Co., Los Angeles, Calif. Stringing of the line along the route traversing the state has been under way for several weeks.







Announcing THE SENSATIONAL NEW FLORENCE *"Registered"* GAS RANGE!

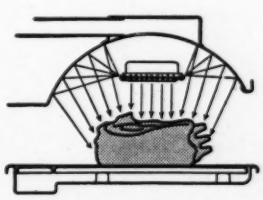
featuring

THE NEW SWING-OUT FLORENCE *Broilercue** and other great "sell-on-sight" features!

- ✔ Completely New Streamlined Turret-Top Design—United and Divided
- ✔ 2-Oven Convenience
- ✔ Famous Florence Baking Oven
- ✔ Easily serviced from the top
- ✔ New C-Quik Gas Cock Handles
- ✔ New De Luxe Top Light, Combination Telechron Electric Clock and Time Reminder, Utility Outlet

IT'S *new design* inside and out! It's a two-oven range in one! It has the new Florence Swing-Out Broilercue* with features never before seen in any gas range! It's the result of the greatest housewife survey ever conducted in the industry—and more than 70 years of Florence experience.

*Patents applied for



ONLY FLORENCE OFFERS FOCUSED HEAT

The arched Broilercue roof is designed to distribute penetrating *radiant heat* over entire broiling surface. Result: More delicious, more healthful food with minimum shrinkage.

The Greatest Step Forward in Broiler Design in Years!

Just imagine what a hit this new Florence Broilercue will make with housewives! It does all three — broils, roasts and barbecues. Furthermore, 2-oven convenience means that hot breads and casseroles, for instance, may be taken from the oven at the same time a roast or steak is ready in the Broilercue. Packed with *exclusive features* that add new ease and efficiency every housewife will want.

FLORENCE STOVE COMPANY . . . General Sales Offices and Plant: Gardner, Mass. Western Sales Offices and Plant: Kankakee, Ill. Southern Plant: Lewisburg, Tenn. Other Sales Offices: One Park Ave., N. Y.; 1459 Merchandise Mart, Chicago; 53 Alabama St. S.W., Atlanta; 301 No. Market St., Dallas.

Florence
GAS RANGES

Joseph W. Bowes, right, new INGAA president, and Fred W. Peters, new treasurer.

H. W. Long, second from right, Amarillo, Texas, explains a point to D. A. Hulcy, C. H. Zachry, and W. H. Wildes, all of Dallas.

Three INGAA officials confer: Charles L. Orr, Mid-Continent representative; Wesley E. Disney, general counsel; John A. Ferguson, executive director.

Dominatio

THE Independent Natural Gas Association of America aimed its heaviest artillery at the Federal Power Commission and kept blasting away all day long, when members gathered for the one-day second annual meeting held in Fort Worth, Texas, Nov. 22.

From Retiring President E. Buddrus' annual report, which opened the meeting, to the discussion of "Regulatory Practices," by Judge P. A. Lasley of Little Rock, Ark., last event on the day-long program, the dominating theme of the meeting was "curb the FPC."

Opposition of the membership to encroachment of the commission into operations of natural gas production and distribution was crystallized in a

Gathered about outgoing President E. Buddrus, second from right, are three of the principal speakers at the INGAA convention. From left, P. A. Lasley, Little Rock, Ark., Mark H. Adams, Wichita, Kan., legal committee chairman; and Capt. E. S. Pettyjohn, director, Gas Institute of Technology, Chicago.

tiqy FPC is Attacked by INGAA

unanimously accepted resolution calling for amendment of the Natural Gas Act as it defined jurisdiction of the commission over the industry's affairs.

The resolution said:

"WHEREAS, the legal committee of the Natural Gas Industry Committtee has prepared and considered certain recommendations for amending the Natural Gas Act as desirable for proposal to Congress, and

"WHEREAS, the Natural Gas Industry Committee has approved said principles and has recommended to the Federal Power Commission in its brief in Docket G-580, the Natural Gas Investigation, that the commission submit the said recommendations with approval to the Congress in its report of Docket G-580, and

"WHEREAS, the Independent Natural Gas Association of America has thoroughly considered the said recommendations.

"NOW, THEREFORE, BE IT RESOLVED by the Independent Natural Gas Association of America that it does hereby approve in full the said recommendations for amending the Natural Gas Act in substance as they are proposed to the Federal Power Commission, it being the considered judgment of the Independent Natural Gas Association of America that the passage and approval by Congress of the said recommendations for amendment will be to the best interests of the public at large as well as to the natural gas industry."

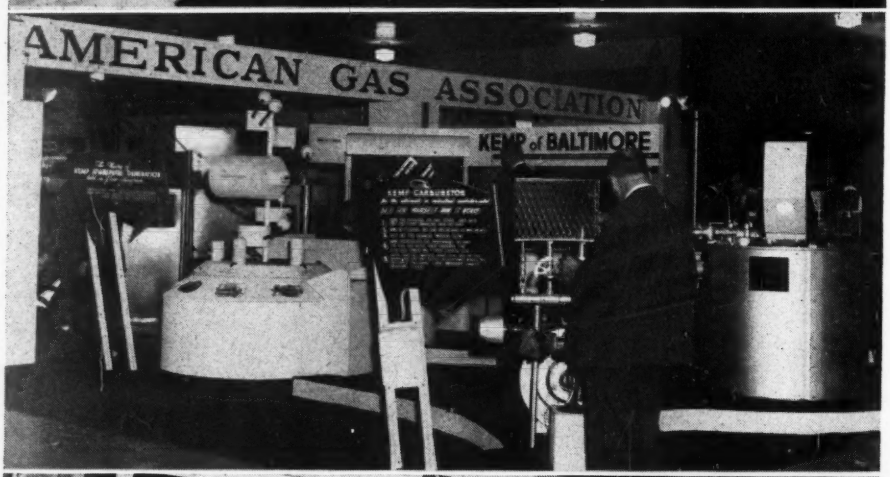
Declaring that "we are inescapably faced with the fact that the anomalous position in which the gas industry finds itself is directly attributable to the policies and practices of the Federal Power Commission," Mark H. Adams of Wichita, Kan., chairman of the INGAA legal committee, lashed out in one of the day's bitterest attacks upon the commission.

"By the insidious means of gradual change in administrative policy and paternalistic attitude," said Mr. Adams, "we find that the Federal Power Commission has opened wide its arms to embrace every phase of the natural gas industry. Of what value was the assurance at the opening of the recent investigation that the Federal Power Commission had no desire or intention to extend its jurisdiction? Has it not far exceeded the power already granted by Congress? Witness the series of court decisions, on each of which we find a divided opinion, whereby the commission has received legal sanction for this gradual assumption of complete control. Anyone who goes to court against a government agency has two strikes on him at the outset. The presumption seems to be that anything done by a government agency is all right, and the courts have been extremely reluctant to overrule any administrative action."

The Interstate Case

By way of illustration, Mr. Adams cited the Interstate Natural Gas Co. decision of the Fifth Circuit Court of Appeals, decided Aug. 3, 1946, "where it was held that although the physical aspects of production and gathering were outside the FPC's jurisdiction, nevertheless the economic incidents were within its jurisdiction. . . . How in the world can the economic incidents possibly be separated from the

Gas Goes To Two Shows



Gas-fired equipment had two impressive showings recently, occupying prominent positions at the National Metal Congress and Exposition, held at Atlantic City, N. J., Nov. 18 to 22, and the 17th National Exposition of Power and Mechanical Engineering, Grand Central Palace, New York, Dec. 2-7.

Gas men made their bow at the traditional Industrial Gas Breakfast in the Hotel Traymore, Nov. 20.

Many of the 42,000 visitors to the Metals Congress viewed the carburetor and atmosphere generator display (center) of the C. M. Kemp Mfg. Co., Baltimore, Md., and exhibits of 11 other gas equipment manufacturers.

The combined exhibit at the power show included 30 gas-fired items manufactured by 10 companies. Nearly 50,000 viewed the exhibit. Gas men who assembled for the bottom photo were, at left, seated: N. E. Berth, Partlow Corp., New York; Earl Gilbert, Ernest C. Lundt, Inc., Caldwell, N. J.; John Mehoman, American Gas Furnace Co., Elizabeth, N. J.; Alvin M. Stock, Partlow; and A. V. Luderman, Mear, Kane, Ofeldt, New York.

Standing: M. Smith, Selas Corp. of America, New York; H. W. Staidsberg, Consolidated Edison Co. of New York, Inc.; Charles Schisler, Mears, Kane, Ofeldt; Howard Partlow; W. R. Hones and Robert Hones, Charles A. Hones Inc., Baldwin, L. I.

physical incidents for practical purposes?

"The commission has adhered dogmatically to the original cost theory in determining rates even though the act denies their jurisdiction over production and gathering properties and facilities."

The decision in the Interstate case "makes it even more imperative" that the act be amended and clarified, and that all interested agencies present a uniform and comprehensive program to Congress, he said.

Every Producer Affected

"Does not every producer of gas, whose gas goes into interstate pipe lines, whether incidental to his principal purpose or not, face the possibility of being declared a 'natural gas company' and subject to the control of the Federal Power Commission?"

The aims of the amendments to the Natural Gas Act as proposed by the Natural Gas Industry Committee the speaker outlined as follows:

To limit FPC jurisdiction to the activities described by Congress as affected by a public interest, namely: the transportation in interstate commerce and sale after such transportation to local distributors for resale to ultimate consumers.

To insure that a producer of gas who is also an interstate transporter will have an opportunity to obtain a fair return on his producing properties which will encourage field prices to the independent producer.

To eliminate some of the mechanics required in certificates cases and allow reasonable improvements and extensions without the necessity of a hearing.

Expanding on the last-named point, Mr. Adams said:

"The records show that the commission's policy of allowing unlimited intervention in hearings has occasioned an extreme amount of delay in final determinations. The calendar has been loaded and they have been many months behind; yet there has been no diminution of interventions.

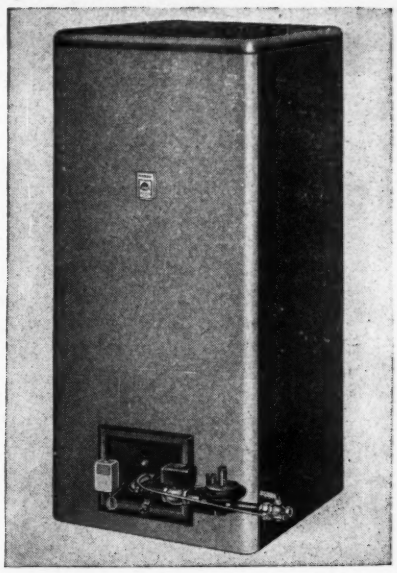
"Our competitors are laughing up their sleeves and taking on new customers while we sweat out these long hearings and watch our costs mount."

Judge Lasley Hits FPC

Judge Lasley added his voice to the outcry against the federal agency in his discussion of regulatory practices. However, he declared that the utilities themselves were in part responsible for their present predicament.

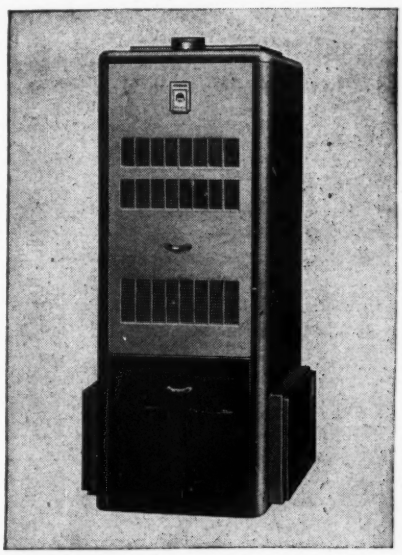
"In the early days of utility regulation by the states," he said, "utility companies battled state regulation as hard as they are now battling federal regulation. In those days utility companies, wherever possible, claimed they operated in interstate commerce

Your customers get years of carefree comfort



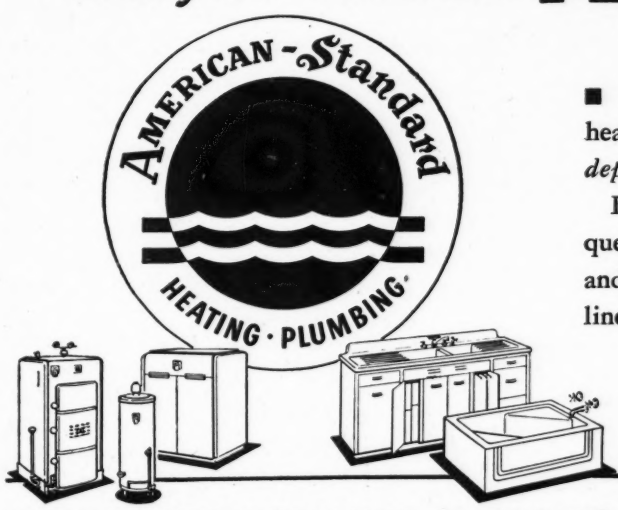
SHAWNEE . . . gas fired gravity furnace. Available in 7 sizes from 65,000 to 140,000 Btu input. Features automatic gas valve and pilot, pressure regulator, fully accessible parts.

...safe, economical heating



WYANDOTTE. . . completely automatic gas fired winter air conditioner designed for minimum floor space . . . utility rooms, closets, small basements. Available in 5 sizes from 70,000 to 150,000 Btu input.

When you recommend AMERICAN-Standard HEATING EQUIPMENT



■ Your customers will want to know three things about gas heating equipment. Is it *economical?* Is it *safe?* Will it give *dependable* service year after year?

If you want to give a vigorous "yes" to these and many other questions, we suggest you recommend gas fired boilers, furnaces, and winter air conditioners from the famous American-Standard line. **American Radiator & Standard Sanitary Corporation,** P. O. Box 1226, Pittsburgh 30, Pennsylvania.

Serving the Nations' Health and Comfort

LOOK FOR THIS MARK OF MERIT—It identifies the world's largest line of Heating and Plumbing Products for every use . . . including Boilers, Warm Air Furnaces, Winter Air Conditioners, Water Heaters, for all fuels—Radiators, Convectors, Enclosures—Gas and Oil Burners—Heating Accessories—Bathtubs, Water Closets, Lavatories, Kitchen Sinks, Laundry Trays, Brass Trim—and specialized products for Hospitals, Hotels, Schools, Ships, and Railroads.

and were subject only to federal control. Now they want to get back under state control.

"I believe the states are capable of assuming jurisdiction if they would pass adequate laws with teeth in them and then enforce the laws."

Ray of Hope

Judge Lasley pointed to a ray of hope for utilities in the action of the Arkansas Public Service Commission now being heard by the Supreme Court, which holds that the Federal Power Act denies jurisdiction of a federal agency over utility records where a state assumes such jurisdiction.

Judge Lasley also spoke at length of Arkansas' experiences with federal power projects.

The spirited anti-FPC sentiment crept into nearly every talk on the day's program. Said E. Buddrus, president, Panhandle Eastern Pipe Line Co., "The Interstate case is of great significance to the thinking of all natural gas men, and oil men, when they consider the actions of the Federal Power Commission." The entire petroleum industry will be seriously affected if the philosophy adopted by the commission in the Interstate case is not corrected, he said.

Expansion of Power

"The philosophy adopted by the FPC to justify its action is such that if extended to its ultimate conclusion it will place under the jurisdiction of the commission any producer of any quantity of natural gas that might be determined eventually to enter interstate commerce."

Said Capt. E. S. Pettyjohn, director, Gas Institute of Technology, Chicago, speaking on "Natural Gas and Its Future:" "The natural gas industry has been imposed upon by the FPC—but, the FPC's way of thinking seems to be gradually changing."

He commended the INGAA for fighting against the "bureaucratic excesses" of the commission. He laid partial blame for the imminent shortage of gas in the eastern areas at the FPC doorstep, citing the commission's failure to give prompt attention to applications for gas lines from the southwest, which could augment the dwindling Appalachian supplies.

Dotterweich's Warning

Said Dr. Frank Dotterweich, Texas College of Arts and Industries, Kingsville, speaking on "The Producers of Natural Gas:" The FPC must not be allowed to move into the domain of production and gathering regulation, including field price and end use.

NEW INGAA OFFICERS

PRESIDENT—Joseph W. Bowes, president, Oklahoma Natural Gas Co., Tulsa.

FIRST VICE PRESIDENT — Paul Kayser, president, El Paso (Texas) Natural Gas Co.

SECOND VICE PRESIDENT — J. Harold Dunn, president, Shamrock Oil & Gas Corp., Amarillo, Texas.

TREASURER—Fred W. Peters, treasurer, Oklahoma Natural Gas Co.

BOARD OF DIRECTORS — H. W. Long, Guymon, Okla.; E. Buddrus, president, Panhandle Eastern Pipe Line Co., Chicago; D. D. Harrington, Harrington, Hagy & Marsh, Amarillo; Joseph Bowes; Paul Kayser; Gardiner Symonds, president, Tennessee Gas & Transmission Co., Houston; W. H. Wildes, president, Republic Natural Gas Co., Dallas. All directors were re-elected, with the exception of Mr. Symonds, who succeeded Elmer Schmidt, vice president, Lone Star Gas Co., Dallas. Terms of five other board members do not expire until next year.

Other topics did usurp some of the attention of the INGAA members. Mr. Buddrus, in his report on the three-year-old association, told of the place the INGAA had won for itself in the industry, and of the work it had done in intervening in FPC hearings and assisting in Senate investigations.

Industrial Expansion Needed

Capt. Pettyjohn asserted that only 20% of the present house heating load in the north and east is now gas-fired, as peak-load demands limit the extent to which gas can enter this field in those sections. He stressed the importance of installing propane for peak-load standby.

Looking into the future, Capt. Pettyjohn advocated more action in extending the uses of natural gas into hydrocol plants, chemical plants, gas turbines, and other applications in order to offset peak-load problems.

Gas lines should, he felt, have been doubled during the past year.

If some means were found to bring about a substantial increase in the field price of gas in the southwest, many of the industry's problems would be solved, he said.

DeGolyer on Reserves

Dr. E. DeGolyer of Dallas, speaking on "Natural Gas Reserves," reviewed the situation as was made evident following his recent estimates. He expressed deep interest in the possibilities of recovering sizeable volumes in the off-shore Gulf Coast operations.

D. A. Hulcy, president, Lone Star Gas Co., Dallas, in his talk on "The Transportation of Natural Gas," said:

"The problem of venting casinghead gas into the air is not a question of the oil industry versus the gas industry, but a problem for both which should be solved by petroleum industry action without imposition of rigid regulation.

Casinghead Problems

"It is frequently the case that the producer is willing to make his casinghead gas available only on a basis which will in no way alter his oil-producing procedure, presently used or anticipated for the future. The result of this situation is that the producer usually feels that the adaptation of his operations to the requirements necessary to permit the transporter to take the gas is unreasonable and unprofitable to him; and that it is the duty of the transporter alone to fit his operations to the existing circumstances. On the other hand, there may exist in the attitude of some gas transporters an apparently unjustifiable degree of resistance to the taking of casinghead gas." His solution to the problem is contained in the article in this issue.

A warning that the industry must consider the royalty owner was voiced by H. W. Long of Amarillo, Texas, who said:

"It (natural gas) is the only natural resource I know of wherein the land owner, once he has signed the regular form of lease, can be forgotten, as he has no rights. He is simply given his check periodically when enough money has accumulated to warrant the writing of a check.

Owner Not Consulted

"Nothing is said to him at the time the well is drilled. No advice is given him as to the size of the well, or the amount of production which is to be taken from it, or the price to be paid for it. The companies generally are following the theory of forgetting the land owner, as I had one well in production for 10 months before even a division order was sent to me. I have two wells now with another company which were completed four months ago and recent inquiry from this company reveals that they are soon going to prepare a division order and send it.

"I want to ask the industry, which is fully represented here: Just how much can you expect from that kind of a background when you need support from that group to shape the Natural Gas Act modifications?

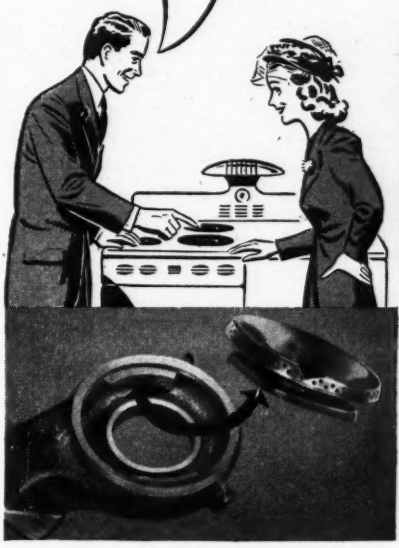
"A summary of the FPC natural gas investigation hearings, which were held, showed two outstanding things needed to eliminate the worst features of the production of gas.

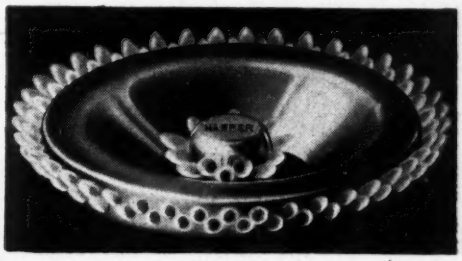
This is the new, improved

HARPER CENTER SIMMER BURNER

HERE is the new Harper top burner that is winning widespread acclaim from the gas industry. It will find equal favor with housewives because it makes possible even better cooking results than users of the Harper Burner have enjoyed in the past.

Years of laboratory research and field tests contributed to the development of this scientifically engineered burner. The net result is that it makes possible fuel savings up to 39%, eliminates guess-work in cooking, saves pot-watching, keeps kitchens cooler, offers more healthful, less wasteful cooking . . . cleaner, odorless cooking.





▲ NEW, IMPROVED CONSTRUCTION!
Note how the two rows of flame ports are staggered, permitting better flame adjustment than is possible with ordinary top burners . . . flames do not "float off" or blow away . . . combustion is more efficient.

◀ EASIER TO CLEAN!
No castings or bolts to remove . . . a slight twist removes burner for cleaning.

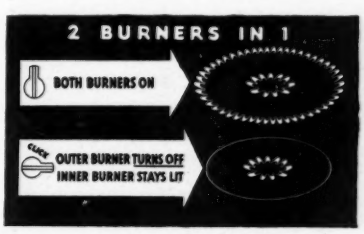
We're telling your Customers about it!

Before Buying Your
NEW RANGE
. . . make sure it has the famous
HARPER CENTER SIMMER BURNERS
Look inside for the booklet with this seal
TOP BURNER COOKING
The Harper Center Simmer Burners are superior to ordinary top burners because each Harper burner is really 2 burners in 1. As shown in diagram, the big outer burner brings foods to a quick boil. Turn handle until it "clicks" and the big burner goes out, leaving only the small, efficient inner burner lit to finish the cooking.
Only the separate Harper Center Simmer gives you the controlled low heats you need to keep foods warm for serving . . . to eliminate pot watching and boiling dry . . . to allow cooking with little water, which saves time and gas and keeps the average kitchen 9 degrees cooler. Only the Harper separate Center Simmer can help you so much in your cooking.
Insist on Harper Burners!
*18 Leading Gas Ranges are Harper Equipped
2 BURNERS IN 1
BOTH BURNERS ON
CLICK
OUTER BURNER TURNS OFF
INNER BURNER STAYS LIT
HARPER-WYMAN COMPANY, CHICAGO 20

A NEW CONSUMER advertising program appearing in leading women's magazines tells prospective range buyers about the advantages of the Harper Center Simmer Burner. Many of these 21,500,000 readers will buy from *you*, and here's how you can trade them up to a higher-priced range:

We have prepared a FREE booklet, "How to Sell More Gas Ranges," which contains a series of quick, convincing sales floor demonstrations that graphically illustrate the superiority of the Harper Center Simmer Burner. Send for copies for your salesmen. Harper-Wyman Company, 8562 Vincennes Avenue, Chicago 20, Ill.

The Harper Center Simmer Burner operates on the unique principle of "2 burners in 1" . . . a STARTING BURNER for frying and to start foods boiling, plus a small, economical COOKING BURNER, to maintain the cooking . . . both controlled by the same handle. It is subject to finer gradations of low heats—greater control and economy—than any other top burner made.



HARPER CENTER SIMMER BURNER *". . . Holds the Lines for Gas"*

HARPER CENTER SIMMER

"First was to improve the well head price. Second was to allow every producer to receive the same amount for his gas when produced, whether marketed by himself or others. In view of this common recognition by the gas industry, even though months have gone by, no progress is evident. The companies remind me of these many government bureaus who agree that something should be done, but no one takes any interest in trying to see that it is done. If the boys in New York have final word, let's have them come out.

"I subscribe to the theory . . . and I believe the sooner it is recognized by the industry the sooner we will commence really to develop the natural gas industry . . . that the land owner is a partner.

Curtail FPC

"I am very much concerned with the powers that FPC is attempting to exercise. One of their later decisions could easily place me under the control of that commission as a royalty holder. I want to say now, and I believe I am speaking for practically all the royalty holders, that we do not subscribe to the bureau type of government; and I think the next Congress should sharply curtail the authority of the FPC. I want you to bear in mind, however, that prior to the hearings, which will be held in Washington on FPC reports, much good work can be done, but it must actually be done and not promised.

"Let not the thought develop that the only apparent relief for the forgotten man is with the Congress. The royalty holders could develop this thought that if our state commissions have no authority and the FPC has no authority except over earnings, then it might be the only way to get a decent price at the well head would be to give this power to FPC. It is a dangerous thought, but could look inviting if the attitude of the companies remains as it is.

"I think it is high time that the industry recognize the necessity of taking into its confidence in an intelligent manner its royalty holders."

A.G.A. To Issue Bulletin On Gas Selling Ideas

"Promotion!" is the title of a new bulletin which will be published periodically by the Promotional Bureau of the American Gas Association. The first issue, a four-page folder, was published in November. The material included in the bulletins may be copied or commented upon without permission.

CALENDAR OF ASSOCIATION ACTIVITIES

January

American Gas Association Home Service Workshop — Netherland Plaza Hotel, Cincinnati, Ohio, Jan. 20-23.

Midwest Industrial Gas Council—Stevens Hotel, Chicago, Jan. 24.

February

American Gas Association Residential Gas Section, Eastern Natural Gas Sales Conference — Roosevelt Hotel, Pittsburgh, Pa., Feb. 13-14.

March

American Gas Association Residential Gas Section, Mid-West Gas Sales Conference—Edgewater Beach Hotel, Chicago, March 17-18.

New England Gas Association—Boston, March 20-21.

Gas Appliancc Manufacturers Association, Hotel Restaurant & Commercial Gas Equipment Division—Stevens Hotel, Chicago, March 24.

National Restaurant Association Convention — Stevens Hotel, Chicago, March 25-27.

April

American Gas Association—Edison Electric Institute Accounting Conference—Hotel Statler, Buffalo, N.Y., April 7-9.

Mid-West Gas Association Annual Meeting and Convention—Hotel Paxton, Omaha, Nebr., April 7-9.

National Association of Corrosion Engineers Annual Convention—Palmer House, Chicago, April 7-10.

American Gas Association Distribution and Motor Vehicle Conference—Hotel Cleveland, Cleveland, Ohio, April 14-16.

Gas Appliance Manufacturers Association Annual Meeting — Drake Hotel, Chicago, April 14-16.

Southern Gas Association—Biloxi, Miss., April 16-18.

Gas Meters Association of Florida-Georgia — Boca Raton, Fla., April 25-26.

U. S. Chamber of Commerce Annual Meeting—Washington, D. C., April 29-May 1.

American Gas Association Natural Gas Department Spring Meeting—Stevens Hotel, Chicago, April 30-May 2.

May

Southwestern Gas Measurement Short Course—University of Oklahoma, Norman, Okla., May 6-8.

Indiana Gas Association—French Lick Springs Hotel, French Lick, Ind., May 15-16.

Pennsylvania Gas Association — Wernersville, Pa., May 20-22.

June

American Gas Association Joint Production and Chemical Committee Conference—Hotel New Yorker, New York City, June 2-4.

Canadian Gas Association—General Brock Hotel, Niagara Falls, Ontario, Canada, June 9-11.

American Gas Association Residential Gas Section, New York-New Jersey Gas Sales Conference—Essex and Sussex Hotel, Spring Lake, N.J., June 23-24.

September

Pacific Coast Gas Association 1947 Convention—Coronado, Calif., Sept. 23-25.

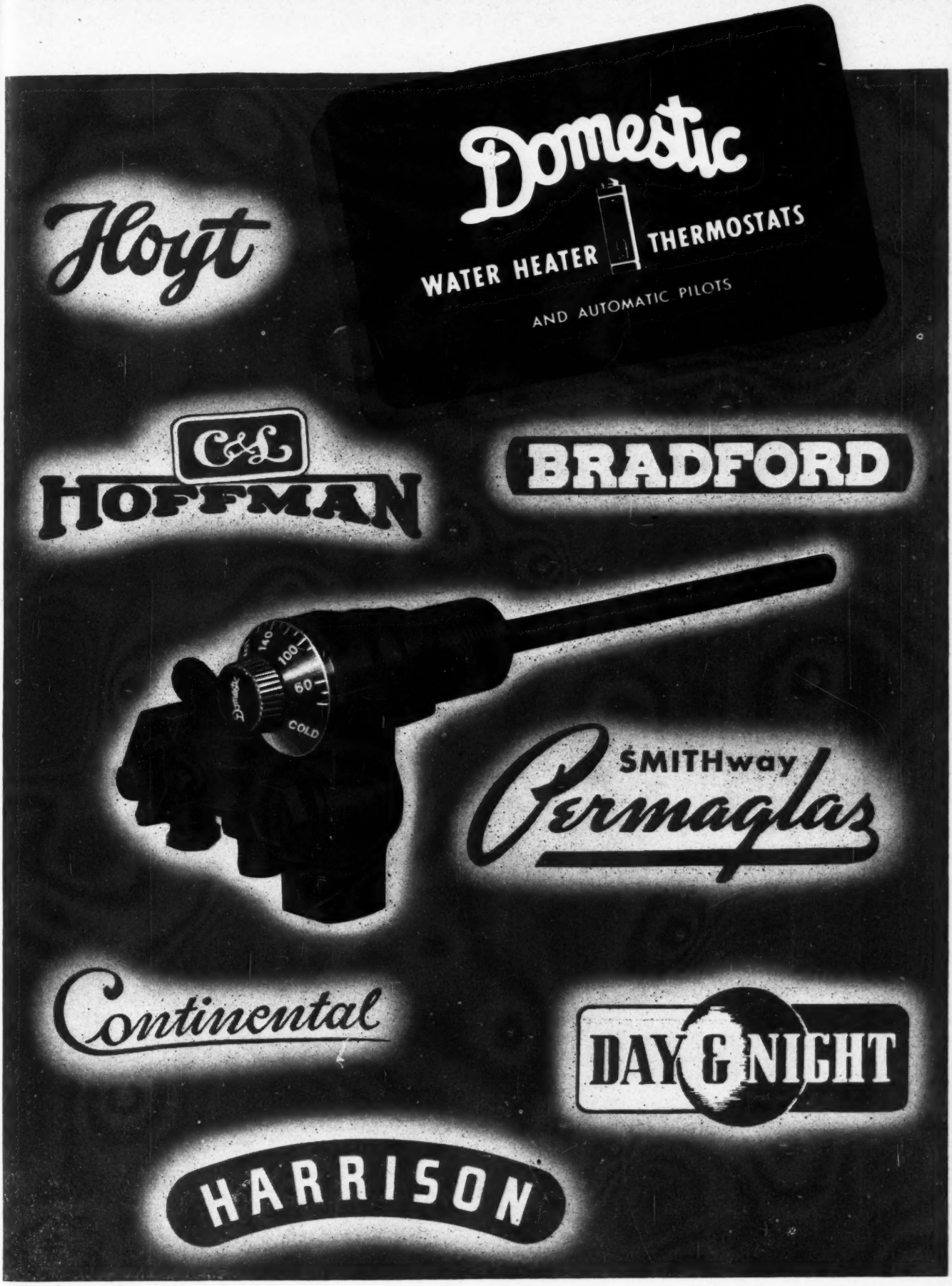
American Gas Association Annual Convention—San Francisco, Calif., Sept. 29-Oct. 3.

Production and Management Trends To Be Discussed at SGA Meeting

A forward look at the trends in production and in management-labor relations will occupy the attention of members of the Southern Gas Association when they gather for the annual convention in Biloxi, Miss., April 17-18. These topics headed the tentative program for the 36th meeting of the association as announced last month by M. H. North, general convention committee chairman, at a meeting of the executive committee in Biloxi.

Top speakers who will address the general sessions to be held on the two mornings will include R. H. Hargrove, president, and H. Carl Wolf, managing director, American Gas Association; and Clayton Rand, philosopher-humorist.

Chairmen of the various sections, whose meetings will be held during the two afternoons, also revealed their tentative plans. Carl H. Horne, Sales Committee chairman, announced the following topics: New Freedom Gas Kitchen appraisal; report on sales programs of member companies of S.G.A.; dealer relations, postwar use of CP, and selling home builders on gas appliances. The Operating Committee, under Floyd L. Carmichall, will discuss training of servicemen,



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DOMESTIC THERMOSTAT COMPANY • LOS ANGELES 15

service connections, methods for detecting and reducing leakage in distribution systems, underground corrosion control, and other problems.

Commercial air conditioning, dehumidification, dehydration processes, industrial research, and the planning of commercial kitchens will be scrutinized by the Industrial and Commercial Committee. The Accounting Committee will conduct panel discussions on topics to be announced later.

An all-day Home Service Workshop will precede the convention on Wednesday, April 16, and will consider such subjects of current interest as pressure cooking, reports of member-companies' home service programs; public relations, public school activities, and commercial cooking.

Chairman Robert M. Hutchison announced that the Accident Prevention Committee will sponsor a round table. The Southwest Personnel Conference, which will hold its spring meeting in conjunction witb the conference, will also have a round table session.

Biloxi's Buena Vista Hotel will be convention headquarters.

Short Course To Be Held In May

The 1947 Southwestern Gas Measurement Short Course will be held at the University of Oklahoma, Norman, Okla., on May 6, 7 and 8, Miss Kate A. Niblack, registration and publicity chairman, announced from Oklahoma City.

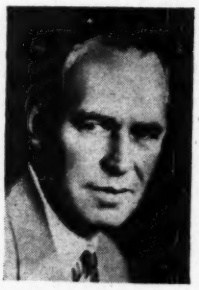
The dates were set following a meeting of the general committee of the short course in November at Houston, Texas, at which R. M. Scofield, Lone Star Gas Co., Dallas, presided.

The following committee chairmen were elected to prepare for and conduct the 1947 short course: E. C. McAninch, Oklahoma Natural Gas Co., Ardmore, Okla., program committee; W. H. Woods, Gulf Oil Corp., Houston, Texas, publications committee; George E. Greiner, Phillips Petroleum Co., Bartlesville, Okla., exhibits committee; B. F. Worley, United Gas Corp., Houston, chairman; J. L. Griffin, Northern Natural Gas Corp., Omaha, Nebr., vice chairman, practical methods committee; Miss Kate A. Niblack, Oklahoma Utilities Association, Oklahoma City, registration and publicity committee; W. H. Carson, dean, college of engineering, University of Oklahoma, Norman, Okla., local arrangements committee.

The next meeting of the general committee is set for Jan. 13.

FOUR MEN WHO MADE GAS NEWS

Clifford E. Hall



D. L. Sedgwick

M. H. North

C. E. Simons

Four men who have figured prominently in news of gas associations in recent weeks are Clifford E. Hall, newly appointed assistant director of the A.G.A. promotional bureau; D. L. Sedgwick, superintendent of gas operations, The Kansas Power and Light Co., Salina, who was elected chairman of the A.G.A. Midwest Personnel Group; M. H. North, advertising and sales promotion director, Oklahoma Natural Gas Co., who, as general convention committee chairman for the Southern Gas Association's 36th annual convention, announced the convention program; and Charles E. Simons of Austin, Texas, elected vice president and general manager of the Texas Mid-Continent Oil and Gas Association.

Hall will assist Bureau Director John H. White, Jr. His past experience includes directorship of public relations for American Home Products Corp.; directorship of press publicity for United China Relief, and of public relations for the Connecticut Light and Power Co.; and advertising work with Batten, Barton, Durstine and Osborn.

Sedgwick succeeds C. C. Jolley, personnel director, Natural Gas Pipeline Co. of America, as a result of balloting at the Midwest Personnel Conference held in St. Louis Nov. 19. He was with the Power Branch of WPB during the war.

Simons was for three and a half years executive vice president of the Texas Good Roads Association. He succeeds the late George C. Gibbons in his new post.

Cincinnati To Be Scene Of Home Service Workshop Jan. 20-23

The eyes of the gas industry will turn on the feminine element this month when the nationwide Home Service Workshop opens at the Netherland-Plaza Hotel, Cincinnati, Ohio. Under the chairmanship of Mrs. Mary Belle Burnett, Cincinnati Gas and Electric Co., who is chairman of the A.G.A. Home Service Committee, the workshop will open for a four-day session Jan. 20.

Food and equipment demonstrations, a home call discussion, and talks on servicing, and installing gas ranges, refrigerators, and laundry equipment will be special features of the program.

The four days will be packed with addresses, demonstrations, and discussions. Leading off will be W. M. Chamberlain, A.G.A. Residential Gas Section chairman, who will explain how "Home Service Fits Into 1947 Sales Promotion." Other A.G.A. officers, including H. Vinton Potter and Managing Director H. Carl Wolf, as well as Walter C. Beckjord, Cincinnati Gas and Electric Co. president, will speak.

Discussion groups which promise interest are a symposium, "Starting Out on the Job," and a four-section group on home service department organization, ranging from one-girl departments to system departments.

Mid-West Gas Association To Meet In Omaha April 7-9

The Hotel Paxton in Omaha, Nebr., has been selected as headquarters for the three-day 42nd annual meeting and convention of the Mid-West Gas Association to be held April 7, 8 and 9. Vice President E. J. Otterbein will have charge of the program. General sessions are planned for the mornings, and the group will be divided into three luncheon meetings on Monday and Tuesday noons and will continue their sessions throughout those afternoons.

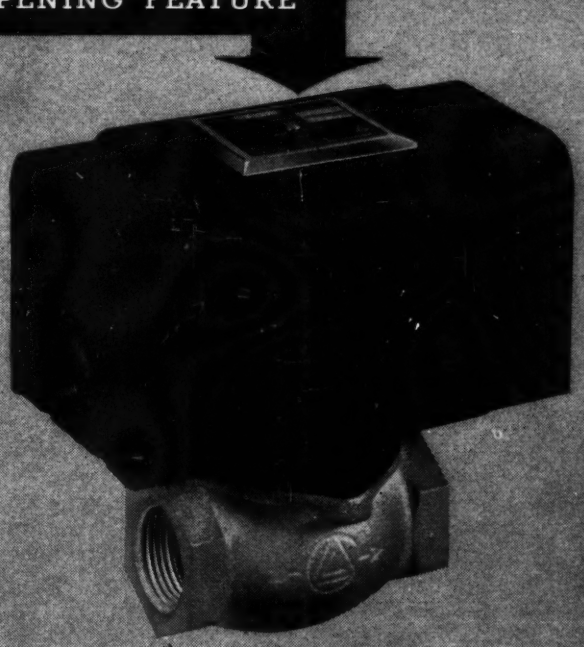
The customary banquet will be held at the Paxton the evening of April 8.

Simpler, better controls for gas burning equipment

"DETROIT" V-570 GAS VALVE WITH EXCLUSIVE STEP OPENING FEATURE

Snap action partial opening on initial operation provides quiet ignition. After about ten seconds to establish draft, the valve opens gradually to full gas flow, eliminating noise and surging. No click or hum—operation of valve is quiet. Closing is positive, valve closes gradually to step position, then snaps off. This step operation is an exclusive "Detroit" feature. Operated by a low voltage heat motor. Installation and wiring are easy. Design simple, exceptionally sturdy, and durable. Valve is easily opened for cleaning, without breaking pipe connections.

This valve has given highest satisfaction on thousands of installations—and its cost is moderate.



"DETROIT" NO. 411 CH THERMOSTAT

Heat compensation feature provides accurately leveled temperature control, eliminating costly overheating—minimizing "cold 70". Heating cycle easily varied to suit conditions of each installation by means of a patented adjustable compensating heater.

Also available without heat compensation.

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"Detroit" Heating and Refrigeration Controls • Engine Safety Controls • Safety Float Valves and Oil Burner Accessories • "Detroit" Expansion Valves and Refrigeration Accessories • Stationary and Locomotive Lubricators

Michigan Storage Project Approved By FPC

A $20 million gas storage project aimed at placing up to 15 billion cu. ft. in storage for delayed distribution to Michigan communities was approved by the Federal Power Commission in December, when it granted a certificate of public convenience and necessity to the Michigan Gas Storage Co., Jackson.

Under terms of the order, natural gas purchased from Panhandle Eastern Pipe Line Co. by Michigan Gas Storage during the summer months will be stored at Winterfield and Cranberry Lake Fields in Michigan, for sale during the summer months to the Consumers Power Co. Other utility customers may also purchase part of the volume.

The gas will be purchased at Freedom Junction and Zilwaukee Junction, Mich., for transmission northward to the fields. In addition, lateral lines from Freedom Junction will carry gas to the Lansing and Alma divisions of Consumers Power, and purchase and delivery at city gates to Flint-Owosso, Pontiac, Jackson, Battle Creek, and Kalamazoo divisions is proposed. Consumers Power serves 241 communities in the state.

Construction permitted under the order include 146 miles of 24-in. line from Freedom to the storage fields, plus laterals; four and one-half miles of 12-in. line from Cranberry to Muskegon compressor station; 6400-hp and 3200-hp compressors at Freedom and North Bradley, respectively; drilling and connecting of 235 storage wells; gathering lines; and new city gate measuring and regulating stations at Alma, Lansing, and various points along the line.

Acquisition from Consumers Power of the 4000-hp Muskegon river compressor station; a 65-mile line from there to Zilwaukee; and two 8-in. lines, one from Cranberry to Muskegon river, was also authorized.

Rate establishment was reserved for further action.

Propane Plant Installed

Pennsylvania Gas Co. is increasing its service facilities for the Erie, Pa., area by installing a propane gas storage plant.

The Chemical Plants Division of Blaw-Knox Co. was awarded the contract for design and construction of the storage plant.

Propane will be used to supplement the company's regular gas supply for industrial and residential users during the peak winter demand.

S. B. Irelan, president, Cities Service Gas Co., opens valve which turns gas into Drumright, Okla., compressor station. From the Edmond fields the gas will be carried to Kansas City, Mo.

Cities Service Opens Two New Lines Supplying Kansas City, Independence

Recent completion of two natural gas pipe lines for improvement of service of the Cities Service Gas Co., the system supplying Kansas City and other Missouri areas, was announced by S. B. Irelan, president of the company, at Oklahoma City, Okla.

A 12-in. pipe line extending 24.5 miles northward from Sedalia, Mo., to the Independence, Mo., town border meter setting was completed about Dec. 15. This improvement cost about $472,000, and will supplement the supply of Gas Service Co. to Independence, and to suburban areas south of there. The line may later carry an additional supply of gas to southeastern parts of Kansas City, Mo.

Earlier, President Irelan opened a valve at the Drumright, Okla., compressor station of his company, which let in gas to that station from the West Edmond and Edmond fields of Oklahoma, through the new line.

This 12-in. line, 64 miles long, will carry 60 MMcf daily of additional gas from the West Edmond area to a connection with the Drumright station, where it will be boosted on to the Kansas City market. The additional supply is residue gas from the gasoline plants of Phillips Petroleum Co. and Continental Oil Co.'s gasoline plants in the West Edmond field.

This new line also will enable Cities Service Gas Co. to transport an additional 20 MMcf daily through its existing 20-in. line north of Oklahoma City. The gas will be supplied through townsite wells in the Cement and Caddo fields of Oklahoma. These improvements cost approximately $1 million.

Awards Include Gas Appliances

Servel Inc. designed and executed two all-gas kitchens, including gas refrigerators and Magic Chef ranges, which were incorporated in the new living quarters built for the winners of "Glamour" magazine's "private lives" contest. One unit consists of living-bedroom, kitchenette, and bathroom and the other is more spacious with living room, bedroom, kitchenette, and bathroom.

The prizes were awarded to Jane Edwards of Shawnee, Okla., and Holly Self of Ninety-Six, S. C., for a 500-word essay stating why each needed private living quarters and a floor plan showing how her home could be remodeled to include one of the prize-winning units.

FPC Authorizes Operation of Line To Bring Texas Gas to Michigan

OPERATION of over 1000 miles of pipe line, running from Hansford county, Texas, to the Austin Storage Field, near Big Rapids, Mich., by the Michigan-Wisconsin Pipe Line Co. was approved last month by the Federal Power Commission. The line, consisting of 22-in. and 26-in. pipe, together with two compressor stations—one in Hansford county and one near Mt. Pleasant, Iowa — and a branch transmission line to Wisconsin and lateral lines to the markets to be served, as well as several existing installations, represents the first facility of a system designed to extend from Hugoton field in Texas to markets in Wisconsin, Iowa, Missouri, and Michigan.

Only the initial facilities were approved in the FPC order. Cost is estimated at more than $52 million. A portion of the existing lines which will be absorbed in the system is owned by the Michigan Consolidated Gas Co.

Service to five cities in two states was specifically authorized in the order. These include Mt. Pleasant, Burlington, Ft. Madison, and Keokuk, Iowa; and Marysville, Mo. In addition, when local authorization has been secured, the following Wisconsin cities may receive delivery: Milwaukee, Racine, Beloit, Janesville, Madison, Green Bay, Sheboygan, Appleton, Oshkosh, Fond du Lac, Manitowoc, Two Rivers, and Stoughton.

Further, Michigan Consolidated was permitted to purchase gas from the system for distribution to its Grand Rapids, Muskegon, Greenville-Belding, and Big Rapids districts.

Before approving the application, 3 to 2, the commission unanimously denied a motion of Panhandle Eastern Pipe Line Co. to dismiss it. The FPC invoked the authority of Sec. 7(g) of the Natural Gas Act, "to grant a certificate of public convenience and necessity . . . to a natural gas company or person which will become a natural gas company, for service of an area already being served by another natural gas company under authority of either 'grandfather' or 'non-grandfather' certificates."

However, numerous clauses in the order will restrict activities of the Michigan-Wisconsin company, including: restriction of sales to FPC-approved communities, and ban on sales pending the following actions: local approval; approval of Securities Exchange Commission of financing plan; filing of lease and agreement to use Michigan Consolidated's facilities; filing for certificate by the Austin Field Pipe Line Co.—and FPC approval of it—for construction and operation of facilities to transport the gas from Austin and Reed City storage fields to the city gates of Ann Arbor, Mt. Pleasant, and Detroit; and filing for certificate by Michigan Consolidated for operation of certain facilities in the storage fields. Further restrictions included enjoinment from infringing upon the existing contract of Panhandle Eastern to serve gas to Michigan Consolidated for resale in Detroit and Ann Arbor.

At the date of termination of the Panhandle Eastern contract—Dec. 31, 1951—the commission may reopen the proceedings to determine the company's rights.

St. Louis County Gas Co. Bought By Laclede; Conversion Planned

Laclede Gas Light Co., St. Louis, Mo., was scheduled to take over the St. Louis County Gas Co. Dec. 31, following approval by the Missouri Public Service Commission and the Securities and Exchange Commission.

Laclede's bid of $11,250,000 was accepted by the North American Co., parent company for St. Louis County Gas, and a contract signed. In addition, Laclede assumes a bond obligation of $1.5 million outstanding against St. Louis County Gas, plus a $75,000 call premium, bringing the total involved to $12,825,000.

Laclede will now provide gas utility service for the entire metropolitan area in Missouri. This move, which was favored by the City of St. Louis, is expected to result in reducing the cost of operation and, by encouraging wider use of gas for heating, help reduce smoke.

Laclede proposes to convert natural gas from the present mixture of manufactured and natural and a start is being made on building a bigger pipe line from Louisiana to accomplish this. However, it may be more than two years before this work can be completed.

"Universal" on The Air

UNIVERSAL gas ranges are now starring in two radio shows. Both on nationwide networks, the programs give away Universals as their major prizes for winners in audience participation contests.

The Columbia network of 147 stations hears John Reed King, as master of ceremonies, give away a Universal every Saturday at 11:30 a. m. Eastern Standard Time, on the 30 minute quiz show, "Give and Take."

From Hollywood, the semi-weekly show "Surprise Party" presents lucky members of the audience Universal ranges every Tuesday and Thursday, at 4:30 p. m. EST.

In the photo, Harold E. Jalass, at left, general sales manager for Cribben and Sexton Co., makers of Universal, is shown talking up the range to King.

California Reopens Probe Of Natural Gas Utilization

California's state-wide gas investigation, interrupted by the war, was reopened last month with hearings in San Francisco, Dec. 4 and 5, and in Los Angeles the following week. Gas reserves, production, and utilization were given extensive study by the staff of the California Railroad Commission.

Reserves and utilization problems were outlined in the initial study presented by Homer Ross, one of the commission's senior engineers. Roy Wehe, assistant director of the Public Utilities Department of the commission, summed up results of studies, and urged the introduction of additional evidence at future hearings, which are scheduled for the latter part of January.

The commission is soliciting information and opinions from utilities, producers, and the consuming public for future study in an attempt to evolve a plan of operation to utilize to best advantage the state's reserves.

TECHNICAL TRENDS

By GUY CORFIELD

Spare the Pavement

While the average gas man may be conscious of the general undesirability of cutting holes in the street pavement, and invoking the semi-serious comment "there's the - - - - gas company digging up the street again," he probably does not realize the large bill each gas company pays each year for removal and replacement of broken pavement.

The benefits that accrue from making street excavations as small as possible are manifold: less interference with traffic, less pavement to break and dispose of, less earth to move, less likelihood of settlement of earth prior to and after paving, less new pavement to pay for, etc.

Considerable effort and ingenuity is being brought to bear on this problem, so that the excavation can be made at exactly the right point, and as small as possible. This involves refinements in exact location of points of leakage, and adaptation and development of tools and fittings that can be used in and below small or narrow openings.

An interesting paper on this subject was presented at the last A.G.A. convention by E. F. Schuldt, Peoples Gas, Light and Coke Co., Chicago, entitled "Distribution Maintenance Work in Small Street Openings." A shortened version of it appears in "GAS' Digests" in this issue.

Broiling

Whenever the discussion turns to broiling, it practically always develops difference of opinion if not heated argument. No two persons can agree on an exact definition of broiling any more than they can agree on the way they want their steak cooked.

While it would not be possible or desirable to change individual tastes, it might be possible to develop some basic purpose or requirement that could be considered as common ground for discussion. Accordingly, the following definition of broiling is submitted: *direct exposure of meat to intense heat effect to produce well-browned exterior, with choice of any degree of "doneness" of interior.* The words "intense heat" are used advisedly, as it is believed that they are synonymous with "broiling" in the minds of the majority of persons. They are also consistent with the dictionary definition, Webster stating that to broil is "to cook by direct exposure to heat . . .; subject to great (commonly direct) heat."

It would seem that this method of cooking is particularly adapted to gas because of the rapid and intense heat obtainable, the action of the flames to consume smoke, and the ability of the hot flue products to carry away the rapidly vaporized water and fats.

From the standpoint of convenience of usage, gas range broilers are being constantly improved. Speed of preheat is shortening the interval of waiting for broiling temperatures. Pans and racks are being developed for convenient adjustment and handling, and easy cleaning and washing. These details would seem to be of obvious appeal to the chef and to the housewife, and to be conducive to the fullest development of the basic advantages of gas for the broiling process.

Information Please

Quite frequently a newcomer to the gas industry asks what book or books he can buy to study the industry's technical operations; or a request comes for reference to a publication that will give information on a specific phase of engineering. For instance, a few days ago a letter came to this editorial office asking for data on the design of gas distribution systems; and, with the exception of a few excellent but highly specialized books, there are not at this time, to the knowledge of this writer, any readily available and "in print" publications on general gas industry technology to which students or investigators can be referred.

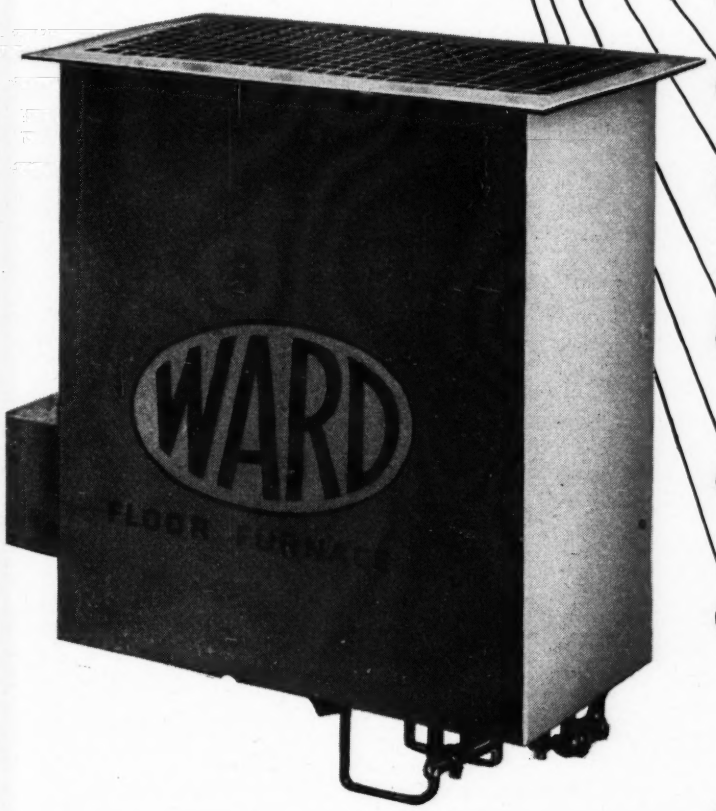
True, many valuable and timely and up-to-date papers have been written and presented and published on every phase of the industry's operations, and the Proceedings of the several gas associations are a complete history and record of the industry's development, but this material is scattered and not available or usable to any extent for anyone not possessing or having ready access to a relatively complete gas industry library.

In these days when books are available on almost every conceivable subject, and each mail brings publishers' advertising sheets on new volumes, it seems too bad that gas industry technology is not well represented; and it appears appropriate to express the hope that if such publications do exist their availability be given wider publicity and, if non-existent or out of date, that new ones will be written.

Conversion Burners

Very noticeable to those in attendance at the recent A.G.A. convention in Atlantic City, and observable to everyone familiar with the trade literature advertising, is the large number of conversion burner assemblies now on the market. Some 50 different models have made an appearance recently and the variety and ingenuity displayed by their designers is intriguing, to say the least. This development indicates a customer desire that is a tribute to gas as the preferred fuel for a wide variety of heating applications. Somewhat of a problem is presented in A.G.A. approval requirements, as many aspects of burner performance are closely related to or influenced by the combustion chamber in which they are installed, whereas a conversion burner is ordinarily not designed for a specific appliance. This matter is now under active investigation and discussion.

The WARD is ideal for all types of installations



1. A Ward Floor Furnace will do *a complete heating job* through installation of two or more units.

2. A Ward Floor Furnace is the only practical means of putting gas heat in many existing homes. There are no difficult installation problems.

3. In many areas where conditions prevent use of basements for major plants a Ward Floor Furnace solves the problem.

4. For many medium and lower income homes where *first cost is a problem,* a Ward Floor Furnace is a means of providing gas heat at reasonable cost.

5. A Ward Floor Furnace is *highly economical* to operate because it can be used for heating of definite areas, providing warmth where needed and when needed.

For the present — shipments will continue to be made only to our long-established dealers. However, we are looking forward to the day when we will be able to offer additional dealers the sales advantages of Ward Floor Furnaces.

WARD HEATER COMPANY
1800 W. Washington Blvd. • Los Angeles 7, Calif.

38 YEARS OF "KNOW-HOW"

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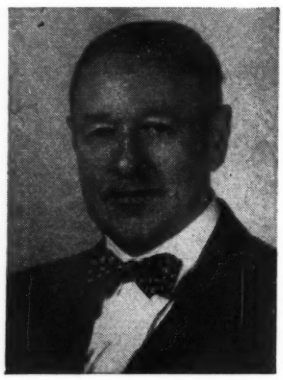
FLOOR FURNACES

PROMOTIONAL NOTES AND NOTIONS

By STANLEY JENKS

Detroit To Benefit

A few months ago, I was complaining of the lack of constructive news about the gas industry in the financial press. That situation has been considerably improved, for A.G.A. statistical information has been finding its way consistently into the "Wall Street Journal" these last several weeks. Factual information like this cannot help but benefit our industry, because it establishes our industry's great part in today's and tomorrow's pattern of the United States. As the Irishman once said about his own country, our glorious past is still ahead of us. Good publicity in the right spots makes the great future of our industry all the easier to attain.



Along these lines, congratulations are due the Michigan Consolidated Gas Co. for its full-page advertisement recently in the "Wall Street Journal," announcing the approval of the Federal Power Commission for a new natural gas pipe line from Texas to the Detroit area. The new line, when completed, will make available to the Detroit district three times the amount of gas used during 1945. The advertisement went on to say that the Consolidated Gas Co. was spending $2 million to enlarge its stand-by manufacturing plant and also to build a new liquefied petroleum plant for winter peak. The new line will be built by the Michigan-Wisconsin Pipe Line Co., to whom the Federal Power Commission certificate was issued.

This shows a sense of public responsibility — sadly lacking in the UMW union leadership — and the public must appreciate that, despite its outstanding job of meeting successfully its winter peaks, the Consolidated Gas Co. plans to do even better.

Demonstration Pays

What in thunderation is bonzolite? Pardon my ignorance, but the way it comes to me, it's the difference between the 50-20 Club and affluence to one ex-GI that I know.

The circumstances are very commonplace to any gas appliance sales manager. This young fellow, with nothing but a noteworthy ambition to paddle his own canoe in this owes-me-a-living world of ours, has told me that it's a push-over selling a special quick cooking set, which works miracles on one top burner. Whole meals are too simple for words. He and his very attractive war bride are cleaning up, so he claims.

He finds a woman who is willing to extend him the facilities of her kitchen and the attention of her friends. The demonstration is arranged. His bride cooks a whole meal with the cooking set while, as he puts it, he talks. The obliging hostess gets the cooked dinner. He tells me that from eight out of 10 demonstrations he averages a sale.

Of course, this is old stuff to the gas merchandising fraternity. But—listen carefully—he tells me the price of this 16-piece cooking set is $150.

One century and a half dollars, mind you, because a whole meal can be cooked in an hour or so, and the material "bonzolite" (?) of which it is made looks like real silver.

And there are among us those who are scared to death to ask the public to pay even less than that for a complete A.G.A.-approved gas range, equipped with every refinement and labor-saving device ever dreamed up to make modern gas cooking a pleasure.

Demonstration plus intelligent salesmanship, as they have always done, are still paying a worthwhile premium.

Heating Restrictions

Two more eastern manufactured gas companies have been added to the list of gas companies authorized this winter by their respective public service commissions to deny new applications for gas heating, with certain exceptions. These companies are the Iroquois Gas Corp., serving Buffalo, N. Y., and vicinity, and the Republic Light, Heat and Power Co., serving many communities in upper New York State.

If the position were not so serious, it would really be one of those unbelievable situations where a veteran gas salesman is seeing the impossible realized. For it is only a few years ago — less than 25 years, anyway — when an awful lot of pavement-pounding and doorbell-massaging was being done to pioneer the use of manufactured gas for home-heating. Those were the days when blood, sweat, and tears were inevitable ingredients in trying to persuade a most reluctant and price-conscious public that cooking gas was IT for perfect home-heating.

Fuel Fundamentals

Even the very ill wind that blows every time the megalomania of John L. Lewis goes on the rampage blows somebody some good. In this instance, the natural gas industry is the main beneficiary, because the availability of the Big and Little Big Inch pipe lines for natural gas transmission has been pushed past the inner Washington political circles, out into the public consciousness. The economic advantages of natural gas through these pipe lines have been headlined throughout the nation, even though initially the flow is low. When a city like Philadelphia has been advised that $2 million annually can be saved in manufacturing gas expense by a natural gas interconnection, even the coal-conscious state politicos are forced to sit up and take notice that they might be holding a tiger by its tail.

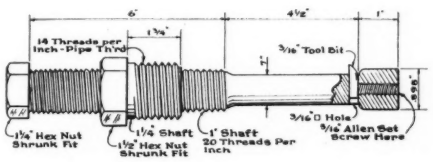
It seems as though a tolerant public will let a guy go just so far in flouting its welfare. Mr. Scowling Eyebrows has at last gone too far, and the public has resorted to our industry as an effective means to slap him down to proper size.

OPERATING IDEAS

Extractor for Changing Tube In Cooling Tower Coil

SUGGESTED BY John Astle, compressor department, Panhandle Eastern Pipe Line Co. The idea is being used successfully at Haven compressor station.

This tube extractor is made of a 12-in. piece of 1-in. shafting, a 2½-in. piece of 1¼-in. shafting, one 1¼-in. and one 1½-in. hexagon nut, and one 3/16-in. Allen set screw. Six inches of 20 threads to the inch are cut on one



end of the 1-in. shafting and the other end is machined down to the inside diameter of the tube (.898) and 1 in. long for a guide. Behind this guide is a 3/16-in. oversize square hole into which to put a round-nosed 3/16-in. tool bit. This bit is held in place by drilling a 17/64-in. hole and tapping out for a 5/16-in. Allen set screw. The diameter of shaft behind the tool bit can be of any size smaller than the inside diameter of the tube. In this case it is .7 in. to allow room for cuttings from the tool bit. The 1¼-in. shafting is drilled and threads made on the inside to correspond with those on the outside of the piece. The 1½-in. hexagon nut is shrunk on one end of this shafting, and tapered pipe threads of 14 threads per inch are put on the the other end to fit the hole where the plug was in the cooling tower coil.

This second piece is then screwed on the first piece as shown in the drawing, and the 1¼-in. six-cornered nut is shrunk on the thread end of the first piece. The bit can be adjusted to cut 1 in. or over and is set so that it cuts out all the tube. Care must be taken not to cut too deeply and cut into the casting.

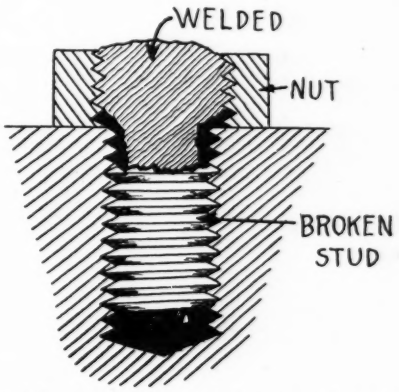
To use this tube extractor, remove the plugs from the ends of the cooling tower coils and screw the 1½-in. nut with the pipe threads into the hole as a support and guide. Then with a ratchet wrench screw the long shaft into the hole and the cutter bit will be forced to cut the tube out as it goes. After it has been cut out at both ends, the tube can be removed easily.

Removing Broken Studs

SUBMITTED by W. F. Schaphorst, M.E., 45 Academy St., Newark, N.J.

The accompanying sketch shows how to remove a broken stud by the welding process—a method that is much simpler and better than the old time-consuming method of drilling, chipping and digging. This process is within the reach of every mechanic whose shop is equipped with electricity.

Place an amply large nut over the broken stud and build up the stud by

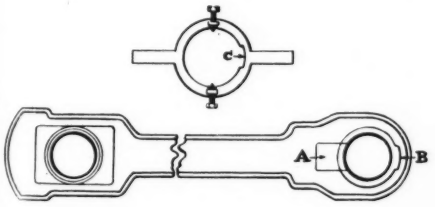


welding onto it, and then weld to the nut. The broken stud and the nut become one solid piece and the stud can be taken out with almost any kind of wrench. The welding process also helps in that it heats the stud, causes expansion, and thus aids in loosening the threads so that the stud can be more easily removed.

Spanner Clamp

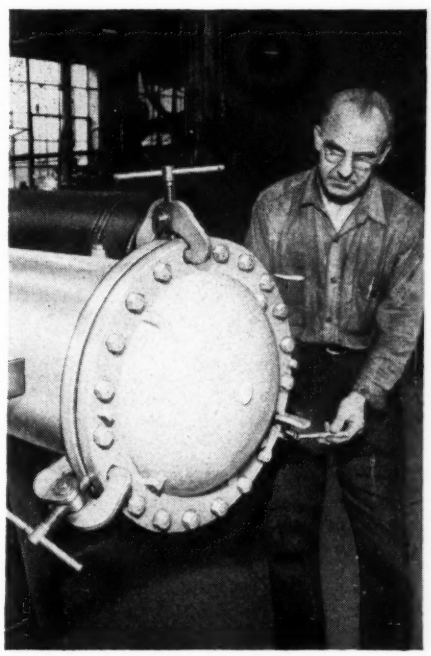
SUGGESTED BY Eugene Brown, Houstonia Station, Panhandle Eastern Pipe Line Co.

Remove wedge half of bearing (A). Place clamp (C) over remaining half of bearing (B). Tighten down clamp screws and roll out bearing. This main



crosshead spanner clamp may be used for installing bearing as well as removing. The estimated saving in time, money and materials depends upon how tightly the bearing is bound.

Gasket Tool Found Useful For Opening Flanged Surfaces



SUGGESTED by T. G. Persson Co., 224 Glenwood Ave., Bloomfield, N. J.

The Persson Flange Jack, originally designed for gasket replacement on pipe lines, has been recommended as ideal for opening all types of flanged surfaces—sectional tanks, evaporators, condenser heads, valve bonnets, heat exchangers, etc. It is claimed that this tool leaves flange faces undamaged with no danger from sparks, flying wedges or chips. For large pieces, such as condenser heads, three to four jacks are recommended. There is no shock or vibration and bolt holes are maintained in perfect alignment.

Jaws are heavy, one-piece steel forgings and screw tips are hardened. Standard size Flange Jacks open standard flanges from 2 in. to 20 in.

The company claims that Flange Jacks permit easy renewal on either full face or ring gaskets.

PEOPLE

• The Moore Corp., Joliet, Ill., has announced that **Herbert L. Stroud,** formerly of Moore, and then, during the war, supervisor of federal construction work, will represent the company in parts of Missouri, Illinois, Indiana and Kentucky. **Harry J. Schedler,** formerly in charge of the Moduflow division, Minneapolis-Honeywell Co., Milwaukee branch, is Moore's new district manager with headquarters in Milwaukee.

• **Elton E. Peavy** has been appointed southwest district manager for the sale of Dresser products to the gas industry, according to **H. Z. Hight,** sales manager. Peavy, who was associated with the United Gas Co. and the Consolidated Gas & Equipment Co. before joining Dresser, will cover Texas, Louisiana, Oklahoma, Arkansas, Mississippi and New Mexico. He succeeds **H. R. Shidel** who will direct the sale of welding fittings in the area and supervise the Houston warehouse, which serves the southwest.

Waukegan offices. Prior to joining North Shore, Jones did graduate work in utility management at Harvard and spent several years with utility companies in Ohio and Colorado. He will head an extensive sales and advertising program to be launched by North Shore when the company converts to natural gas next spring.

T. P. Clark of Highland Park, Ill., is the newly appointed division manager.

• **A. W. Beck,** who has been associated with Southern California Gas. Co. for eight years, has been added to the sales staff of Grayson Heat Control, Ltd., according to an announcement by **Hal Singleton,** sales manager. At Southern California Beck divided his time between the customers service department and the sales department. He spent some time as a service man, became an instructor in the employee training department, and was hotel and restaurant sales representative at the time of his resignation.

• **L. M. Klauber,** vice president and general manager of the San Diego Gas & Electric Co., was made president of his company on Dec. 9 by action of its board of directors in a move to reassign executive responsibility. Klauber succeeds **Hance H. Cleland,** who was in turn elected to the newly-created office of chairman of the board of directors, a full time position.

Klauber joined the company on Feb. 1, 1911, as an electric sign salesman. He was placed in charge of the company's engineering department, then made superintendent of the electric production and distribution departments, assistant general superintendent, general superintendent, vice president in charge of operations and last, on April 22, 1941, he was elected vice president and general manager.

A native of San Diego, Klauber graduated from Stanford University in 1908 with an A.B. degree in electrical engineering. He is a member of a number of technical and scientific societies and in 1941 was honored by the University of California with a law degree for "achievement in engineering and science." He is a past president of the Pacific Coast Gas Association and the Pacific Coast Electrical Association and has served in civic capacities.

E. E. Peavy

H. E. Golden

A. W. Beck

H. Newcomb

L. M. Klauber

A. B. Parker

• At a meeting of the board of directors, **Harvey E. Golden,** general sales manager of Florence Stove Co., Gardner, Mass., was elected vice president of the firm. He succeeds **Henry H. Morse,** who is retiring. Golden, who joined Florence Stove in 1926, was manager of the Midwest sales division, became New York division sales manager in 1929, and has been general sales manager since 1941.

President Robert L. Fowler also announced that **Robert H. Taylor,** former New York division sales manager, has been appointed general sales manager to succeed Golden. **George A. Quinlan,** representative in the Chicago area, becomes Taylor's successor as New York division sales manager.

• **Chester L. May,** vice president of Lone Star Gas Co., Dallas, was elected president of the Texas Manufacturers Association at the recent annual meeting in Dallas. May is in charge of all distribution properties in the Lone Star System.

• **Roy E. Jones,** for the past four years division manager of the North Shore Gas Co., Waukegan, Ill., has been appointed sales and advertising manager with headquarters in the company's

• **Harry Newcomb,** vice president and assistant to the president of Servel, Inc., has been appointed executive vice president of the company by **Louis Ruthenburg,** president. Newcomb joined Servel in 1934 as manager of the commercial refrigeration division, and in 1942 he was made vice president and manager of the electric refrigeration division. He was appointed assistant to the president in 1943, retaining the title of vice president.

• **Marc W. Pender,** American Stove Co. director of market research for Magic Chef ranges, has been appointed a member of a Task Force Committee which is to provide cooking facilities for veterans' housing.

William Lotter, who has been with American Stove since 1929, is now assistant to **A. H. Brodbeck,** director of research, and will be in charge of research development of Magic Chef heavy duty cooking equipment.

• **Leslie C. Battle,** assistant treasurer of Harper-Wyman Co., Chicago, since 1938, has been appointed treasurer of the company, according to **Philip S. Harper,** president. Battle succeeds the late **John J. Toomey.**

• **Alton B. Parker** has joined Hardwick Stove Co., Cleveland, Tenn., as regional sales director with headquarters in Houston, Texas. Parker served as an instructor in an army Officer Candidate School during the war. Before the war he was supervisor of dealer sales programs for United Gas Corp. in Houston, and later he worked as national sales counselor for Gas Appliance and Equipment Manufacturers.

• **Charles W. Bonar,** Chicago sales representative for Tappan Stove Co., Mansfield, Ohio, has been named director of retail sales training for the firm. Bonar, who has been associated with Tappan since 1937, served with the army in Italy. **Earl C. Greene** and **Charles R. Aungst,** both former army officers, have been assigned to the Chicago area as sales representatives.

• **Robert T. Hlavin,** who has been associated with the A.G.A. Testing Laboratories for several years, has joined the gas valve division of the Detroit Brass and Malleable Works as assistant to **William J. Wildern,** manager of the division. Hlavin spent five years in the army, three years in the South Pacific.

• **William J. Murray, Jr.,** of Houston, has been named by Governor-Elect **Beauford H. Jester** of Texas to be his successor on the railroad commission when Jester retires to become governor. Murray served as a railroad commission engineer and as conservation engineer for the Petroleum Administration, assigned to Texas, New Mexico, Louisiana, Mississippi and Alabama from October 1941 to July 1943.

Jester said the great job before the commission is gas conservation and that Murray had done a fine job as chief engineer of the gas industry committee, which took over the conservation program.

• Announcement has been made of the resignation of **C. A. Nash,** Davenport, Iowa, as director of purchases for the United Light and Railways Service Co. and Affiliated Co.'s. Nash will assume the presidency of the New World Products Co., Omaha, Nebr., distributors of Reynolds Metals Products. He has long been prominent in the gas and electric industries, and has held posts in several associations, including the A.G.A. and the Mid-West Gas Association.

• The Spang-Chalfant division of The National Supply Co., Pittsburgh, Pa., has announced plans to reorganize its Philadelphia sub-office in order to serve its customers in the area better. **William H. Taylor,** who has been in the Philadelphia sub-office for four years, will be manager of the district, which will cover eastern Pennsylvania, Maryland, Delaware, southern New Jersey, District of Columbia, Virginia and eastern North Carolina.

• **W. H. Adams,** safety director of The Manufacturers Light and Heat Co., was elected a member of the executive committee for the public utilities section of the National Safety Council at the 34th National Safety Congress in Chicago. Adams has been associated with the Pittsburgh Group in the Columbia System since 1905.

• **Stanley E. Little,** vice president in charge of sales for American Stove Co., Cleveland, Ohio, has been elected vice president and trustee of the Institute of Cooking and Heating Appliance Manufacturers. In his new post, Little will help to reconvert the institute to a peacetime basis.

• **E. J. Kanker** has been appointed manager of the department store division for Bendix Home Appliances, Inc., South Bend, Ind., according to **W. F. Linville,** general sales manager. Kanker was assistant general sales manager of the Norge division, Borg-Warner Corp., Detroit, for five years.

Obituaries

• **Hubert R. Humphrey,** 58, president of General Gas Light Co., died recently of a heart ailment at his home in Kalamazoo, Mich. He was particularly identified with development and engineering phases of General Gas Light, which pioneered arc gas lighting and radiant type and portable gas heating. Humphrey had served as president since the death of his father, who founded the firm.

ARE YOU

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ARE YOU undersupplied on some, and oversupplied on others... with the resulting heavy inventory? Sales low? Unit cost rising? Worker efficiency low because of lack of parts to assemble your product?

ARE YOUR parts suppliers unable or unwilling to make short runs of a few hundred or a few thousand pieces?

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LET US FIGURE ON YOUR REQUIREMENTS FOR DURAL, BRASS, STEEL OR STAINLESS STEEL PARTS

NEW PRODUCTS

Blast Cleaner

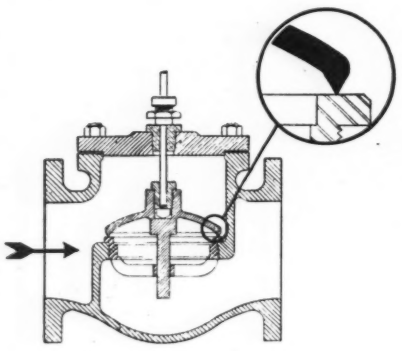
Vacu-Blast Co., Inc., 1054 Broadway, Burlingame, Calif.
Model: Vacu-Blaster.
Application: For cleaning or refinishing metal, concrete or other hard surfaces. The vacuum return system, which permits no abrasives or other particles to escape into the open, permits blast-cleaning under conditions that once would have prohibited this

means of removing corrosion, paint, stains and other deposits.
Description: Operation is predominantly automatic. The blast is controlled by a switch at the gun through which the abrasive blast is directed and through which grit and dust are picked up. The vacuum system operates continuously returning grit and refuse to the reclaiming tank, where reusable grit is returned to the blasting system, while dust and refuse are directed to a dust collector.

No masks, goggles, or protective clothing are needed, and there is no need to suspend other operations or business in the vicinity.

Non-Sticking Valve

Automatic Temperature Control Co., Inc., 34 East Logan St., Philadelphia 44, Pa.
Model: Single Seated Globe Valve—Type GSF-35, Specification 27311.



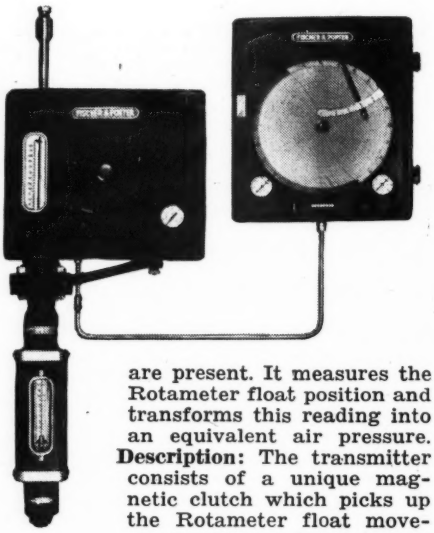
Application: For use in preventing sticking valves caused by dirty coke oven gas with high content of tar and resinous substances. The valve seals with a knife edge, reducing sealing surface area and cutting through heavy gum deposits. Constant repair and attention is eliminated.
Description: Available in 1 to 6-in. sizes, usually motorized either for automatic operation from control instrument contacts or for manual operation from remotely located push button stations. The motorized valve is powered by a universal motor which drives the valve positively open or shut in approximately three seconds. A hand wheel is provided for emergency operation. The unit is available in explosion-proof or weather-proof designs.

Underground Pipe Pusher

Construction Equipment Co., P.O. Box 507, Kalamazoo, Mich.
Model: Big Joe Pipe Pusher.
Application: This patented tool is claimed to save from 20% to 75% of installation costs wherever gas, water or conduit pipe must be put underground. Will deflect most small obstructions, but when solid rock or immovable objects are encountered, a new course can be started without resetting the equipment, thus saving time and labor.
Description: The Big Joe is made in five sizes: for ¾-in., 1-in., 1¼-in., 1½-in. and 2-in. pipe. Outstanding features claimed for it are simplicity of design and operation.

Pneumatic Transmitter

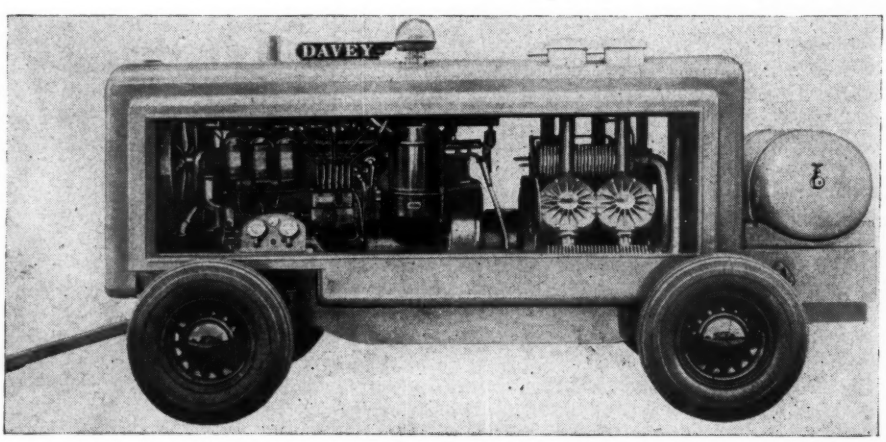
Fischer & Porter Co., Hatboro, Pa.
Model: Pneumatic Transmitter.
Application: May be applied to any Rotameter type flow rate instrument, eliminating the need for electrical transmission and especially useful in locations where explosive volatile gases



are present. It measures the Rotameter float position and transforms this reading into an equivalent air pressure.
Description: The transmitter consists of a unique magnetic clutch which picks up the Rotameter float movement and translates it into external angular motion. Attached to the magnetic follower beam is a new air pilot with a linear pressure output characteristic. The Rotameter readings may be transmitted great distances to recorders, indicators or recorder-controllers equipped with pressure bellows type pneumatic actuating motors.

Portable Compressor Unit

Davey Compressor Co., Kent, Ohio.
Model: 315-WD Air Chief.
Application: Produces 315 cu. ft. of free air per minute at 100 lbs. pressure. Available in standard skid, steel wheel trailer, and pneumatic-tired trailer mounting styles, and flanged wheel types for railroad work. There is no extra charge for spring-mounting on trailers.

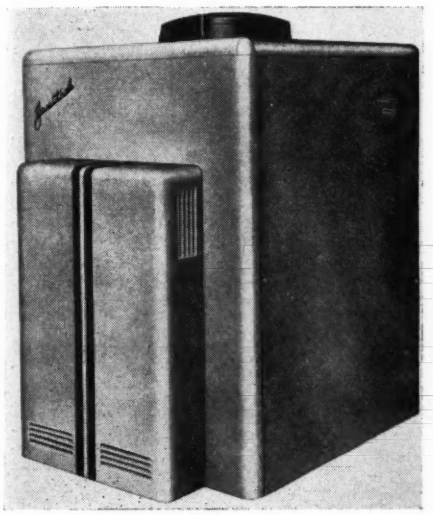


Description: The compressor unit consists of two banks of three cylinders, each bank arranged in W form. This construction, together with a 4-in. piston stroke, reduces compressor vibration to an absolute minimum, according to the manufacturer, and results in a cooler-operating, more efficient machine. The W design permits substantial reductions in dimensions and weight.

Standard gas units are currently equipped with Hercules RXLD engines. The new model has aluminum alloy heads for rapid heat dissipation and valves are the lifetime type, permanently free from carbon formation. The four low pressure cylinders are fitted with individual air cleaners to provide cooling of cylinders and heads during idling periods. Side tool boxes are included in all models.

Gravity Furnace

Surface Combustion Corp., Toledo, Ohio.
Model: Janitrol Series GC S-64 Gravity Furnace.
Application: The manufacturer states that this furnace was especially designed for greatest combustion efficiency and economical operation with gas.
Description: The two sizes in this series are 75,000 and 100,000 Btu. Automatic controls maintain even temperature, and operation of the furnace is said to

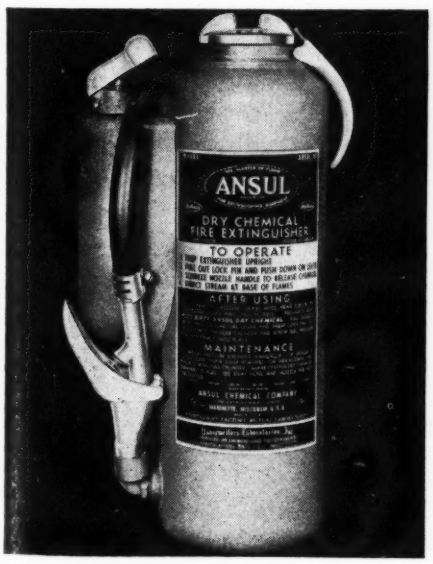


be quiet. Standard equipment includes a flame retention type burner with a special alloy flame diffuser and a venturi to insure the proper mixture of air and gas. It is claimed that the entire unit can be assembled in a matter of minutes. Return air connections can be made at the sides or the rear of the unit. A primary air adjustment is easily accessible and adjustable without tools.

The furnace casing is of 20-gauge steel with baked gray hammerloid finish. All controls are concealed by extending the front panel.

Fire Extinguisher

Ansul Chemical Co., Marinette, Wis.
Model: Ansul-Dugas Dry Chemical Fire Extinguisher.



Application: For faster fire-stopping power even with inexperienced operators. Particularly effective against gasoline, oil, gas, grease and electrical equipment fires.
Description: The Ansul-Dugas expels a dry chemical in powdered form which, on striking flame, releases 1100 times its volume of fire-smothering gases. The stream of dry chemical is easier to direct and control, reaches farther with faster results, and forms a protective heat-shielding screen for the operator. The chemical will not freeze, is non-toxic, eliminates water damage, will not solidify, evaporate or deteriorate, is non-corrosive and non-abrasive. No periodic recharge is necessary, and quick on-the-spot recharge after use is a valuable feature.

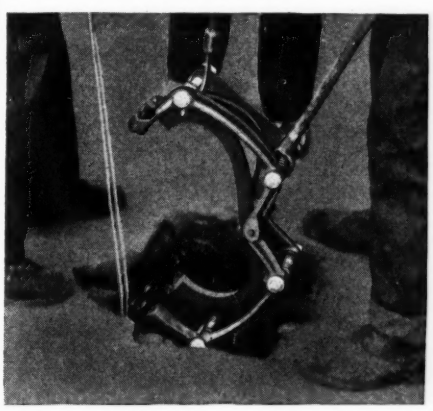
Southern Natural Gas Co. To Increase Capacity

The Southern Natural Gas Co., Birmingham, Ala., recently announced plans to increase the capacity of its system by 50 MMcf daily at an estimated cost of $8 million. C. P. Rather, company president, said an application for the expansion had been filed with the Federal Power Commission and that the program would be completed during 1947 if materials can be obtained.

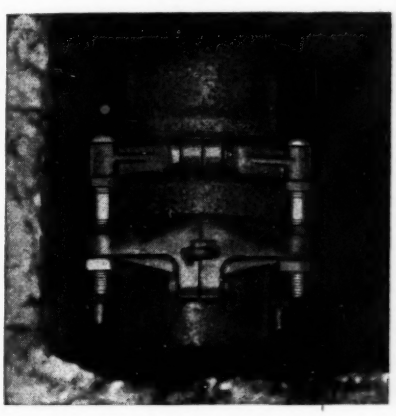
The FPC has been asked to allow the company to extend its system to Chattanooga, Tenn., and Lexington, Miss. The commission was advised that other extensions in North Alabama and Georgia are contemplated.

NORMAC
BELL JOINT CLAMP
Solves Your Joint Repair Problems
QUICK • EASY • PERMANENT

6 inch NORMAC clamp being lowered into hole for installation



6 inch NORMAC clamp in service after installation



Method and product covered by U. S. Patents, Nos. 2,163,261 and 2,178,286.

Installed in pavement openings 1' x 1'. Available in all standard sizes from 3" to 12". A simple set of tools cleans the joint, installs the clamp . . . often in only a quarter of an hour. SAVES TIME. SAVES MONEY and the repair is permanent. Designed for all conditions particularly where pavement repair costs are prohibitive. Write for literature illustrating this simple solution to one of the Gas Industries most trying problems and ask for our catalog describing our complete line of COMPRESSION-END METER BARS . . . SLEEVES . . . COMPRESSION-END COCKS . . . FITTINGS . . . COUPLINGS . . . SERVICE TEES and ELLS.

NORTON-McMURRAY MFG. CO.
39 SOUTH LA SALLE ST. - CHICAGO 3, ILL.

PIPE LINE NEWS

• The Federal Power Commission has announced an order authorizing **The Ohio Fuel Gas Co.**, Columbus, Ohio, to construct facilities enlarging its transmission system to receive additional natural gas deliveries from the **United Fuel Gas Co.**, and to store gas received from **Panhandle Eastern Pipe Line Co.** for delivery in peak periods. Costs were estimated by the company at $3,370,100, with some saving from salvage. Construction will be completed during 1947.

Facilities authorized include an underground natural gas storage project in Lorain and Medina counties, Ohio, to be known as the Wellington storage project; construction of a 2000-hp compressor station in Lorain county, a 2400-hp. compressor station in Lawrence county, and about 88 miles of 16-in. gas transmission lines in Lorain, Fairfield, Licking and Knox counties. The Wellington project will consist of three pools covering about 5225 acres.

• The Federal Power Commission has approved an application of **Panhandle Eastern Pipe Line Co.** for permission to construct additions to its Texas-to-Michigan system. Additions were estimated to cost $23,751,550 and to increase the delivery capacity of the system from 393 MMcf daily to 473 MMcf. Construction is scheduled to commence in 1947.

SMALL GAS UTILITIES CAN PROFIT BY USING BUTANE OR PROPANE

If you are confronted with the high costs of labor, equipment and maintenance for manufacturing gas for a small city you can be sure of an excellent and dependable service, by converting with little expense to Liquefied Petroleum Gas.

Many utility gas companies are including Warren's broad experience, engineering advice and consultation service in planning to convert operations to Liquefied Petroleum Gas.

The small additional plant investment and a minimum of labor, repairs and replacements combine to provide profitable operation. Warren's greatly expanded facilities provide increased production and delivery service adequate to meet your needs. Investigate Warren's products and services today—without obligation.

WARREN PETROLEUM CORPORATION
TULSA, OKLAHOMA
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• The **New York State Natural Gas Corp.**, New York City, has applied to the FPC for permission to construct during 1947 and 1948 facilities to increase the capacity of its transmission and storage system to meet anticipated gas requirements of 15 present and potential customer companies in Pennsylvania and New York. Costs were estimated at $5,250,000.

The company proposed addition to its system during 1947 of about 70 miles of 12¾-in. and 50 miles of 14-in. line loop and about 14½ miles of 16-in. transmission pipe line in Pennsylvania to accommodate a total of 90 MMcf of gas to be received daily from **Hope Natural Gas Co.** In addition, New York State Natural would add three 300-hp compressors to the Boom compressor station so that it would be able to store and withdraw larger quantities of gas in the Boom storage pool.

The facilities planned for construction in 1948 include 21 miles of 12¾-in. and 10 miles of 14-in. loop line to be used to receive 100 MMcf of gas daily from Hope.

• J. D. Davis, district manager for **United Gas Pipe Line Co.**, has announced that his company will begin construction immediately on 86½ miles of 6-in. main, from the United Gas compressor station a few miles southeast of Jackson, Miss., to Philadelphia, Miss. All gas entering the line is expected to come from Mississippi fields.

Towns that will obtain natural gas service as a result of the expansion are Brandon, Pelahatchie, Morton, Forest, Lake, Newton, Decatur, Union and Philadelphia.

• **Ohio Fuel Gas Co.** is installing a new gas compressor station on its transmission line in the southern part of Ohio. The contract for design and construction of the new facilities has been awarded to the chemical plants division of **Blaw-Knox Co.**, which has scheduled construction to permit operations at an early date. Rated at 2400 hp capacity, the new plant will be known as the Tharp station. Its installation is in preparation for increased consumer demands for gas service.

FPC Praises Cooperation On Panhandle Curtailment

In connection with its order adopting emergency service rules and regulations to govern deliveries of natural gas by Panhandle Eastern Pipe Line Co. when curtailment of deliveries is necessary during the winter heating season of 1946-47, the Federal Power Commission stated that the cooperation at the December conference in Chicago of the state commissions, Panhandle, and distributing utilities purchasing gas from Panhandle for resale, represented an outstanding example of the sound way of solving the difficult problem brought about by ever-increasing demands upon distributing companies for natural gas service.

The commission concluded: "Great credit should be given to the representatives of the natural gas industry who voluntarily offered to participate in a workable plan for meeting the emergency."

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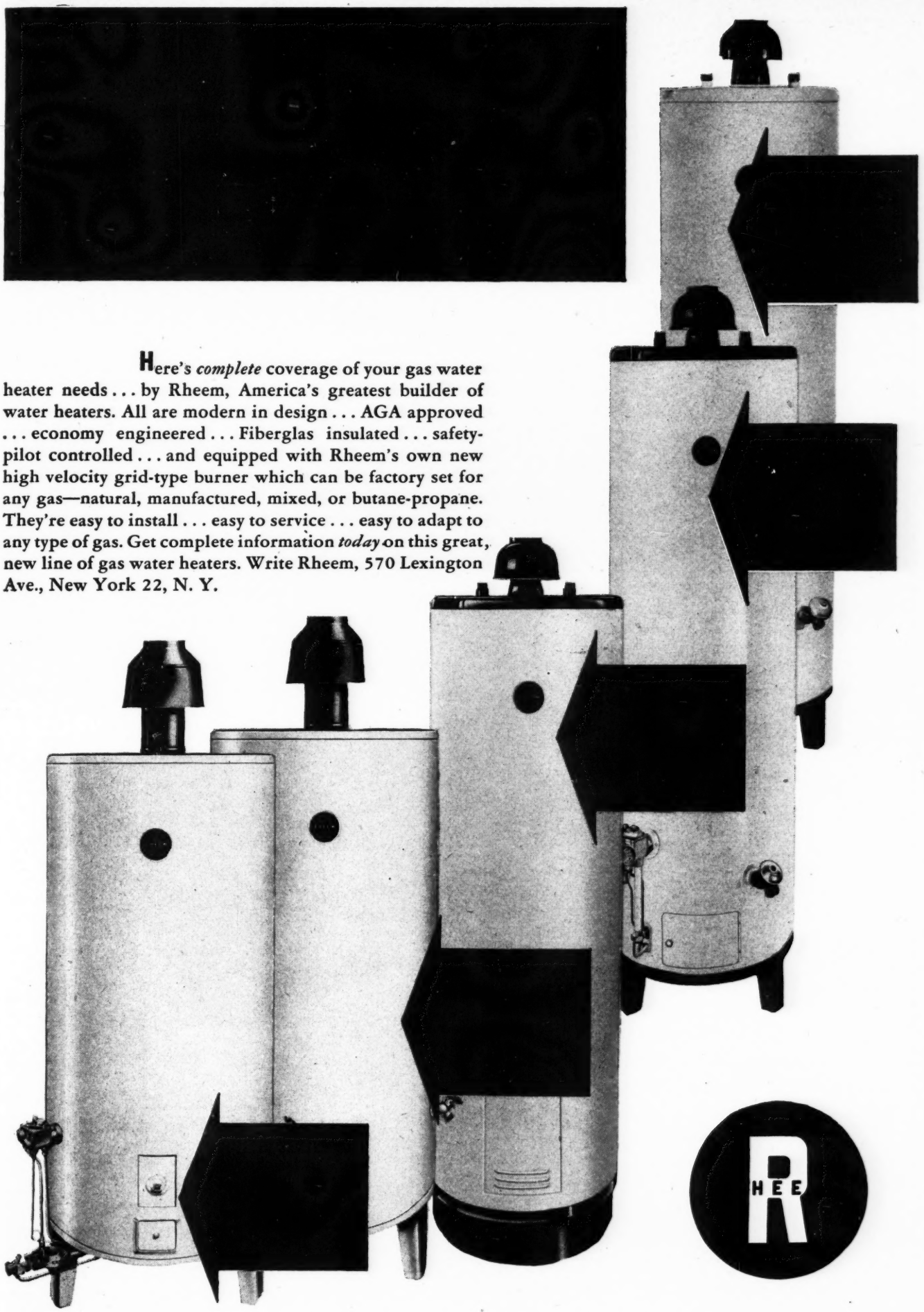

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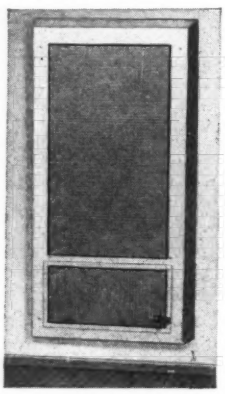

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OMAHA NATURAL GAS CHANGEOVER IN 1947

The Metropolitan Utilities District of Omaha, Nebraska, will change over its system from 600 B.t.u. mixed gas to full Natural gas this summer. A crew of 400 men will be required, beginning June 1, 1947. Housing and food facilities will be supplied. Three to four months of work is assured. Those qualified and interested should apply for full information to . . . .

Personnel Director
METROPOLITAN UTILITIES DISTRICT
18th and Harney Streets,
Omaha 2, Nebraska.

FPC Suspends Rate Plan Filed By Memphis Natural

The Federal Power Commission has suspended rate schedules filed by the Memphis Natural Gas Co., Memphis, Tenn., which would increase the rates for gas delivered to Arkansas Power & Light Co., Mississippi Power & Light Co., West Tennessee Gas Co. and Memphis Light, Gas and Water division of the City of Memphis, by $240,000 annually.

The basic change proposed is an increase of 1.1 cents per Mcf in the price of gas delivered under the general service classification. The present rate for this classification averages about 15.6 cents per Mcf.

Phillips Petroleum Offers Vapor Pressure Chart

Phillips Petroleum Co. has prepared a large scale vapor pressure chart, entitled "Vapor Pressures of Twelve Four-Carbon-Atom Hydrocarbons." The hydrocarbons included are isobutane, isobutylene, 1-butene, 1,3-butadiene, n-butane, trans-2-butene, cis-2-butene, vinylacetylene, ethylacetylene, diacetylene, 1.2-butadiene and dimethylacetylene. Vapor pressures from 0.30 to 800 psia are shown over a temperature range of —110 to +320 F.

The chart, measuring approximately 8 x 24 in., is suitable for mounting on a wall or for inserting in a notebook.

CG&E President Urges Conservation of Gas

President Walter C. Beckjord, Cincinnati Gas & Electric Corp., has urged conservation of natural gas during the coming winter and postponement of further installation of gas heating equipment until spring. Beckjord explained that shortage of pipe and other materials has delayed completion of additions to the pipe line which brings Texas gas to the company, as well as the firm's project for the storage of propane. He stated that more than 8000 homes in the CG&E service area have installed gas heating since the first of the year.

Gas For Carbon Black Receives Price Increase

Although the exact price schedules have not been made public, it is reported that the price agreed upon in the contract which Columbian Carbon Co., New York City, has entered into with Shamrock Oil & Gas Corp., Shamrock, Texas, approximately doubles the old price paid for gas used in carbon black production.

A number of people in the oil and gas industries have been urging an increase in the price of gas sold for carbon black manufacture. Texas Railroad Commissioner Ernest O. Thompson has requested the repeal of a Texas law which permits the burning of 750 Mcf of sour gas daily for making carbon black. He states that operators, land owners and royalty owners are discontented with the low prices now paid and that carbon black manufacturers should buy gas in competition with other buyers of it.

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Fort Madison, Iowa

Louisville Gas & Electric Warns Applicants for Gas

The Louisville Gas & Electric Co. recently announced that it can no longer promise immediate gas supplies to new homes or to converted heating units in existing dwellings. The company warned that applicants for gas connections may face indefinite delay because of the "scarcity of pipe and fittings, combined with disruption caused by the coal strike and freight embargo."

LG&E officials asked potential gas users to telephone the company's sales department and "determine if service pipes and meters are of sufficient size before contracting for the installation of a gas furnace or conversion burner."

Robert Montgomery, LG&E vice president, said the firm's inability to guarantee immediate service on new gas units is due more to the materials shortage than to any general substitution of gas heat for coal.

Rate Hearing Postponed Until January 7

Hearing on rates of Pittsburgh & West Virginia Gas Co. and Kentucky West Virginia Gas Co. has been postponed from Dec. 17 to Jan 7 by the FPC. The proceedings concern an investigation of the two companies' rates subject to FPC jurisdiction and are the result of a complaint filed by the City of Pittsburgh.

The city alleged that the wholesale rates charged by the Kentucky company for the sale of gas to the Pittsburgh company and by the Pittsburgh company to Equitable Gas Co., which distributes gas at retail in Pittsburgh, are unjust and unreasonable.

Noma Electric Corp. Adds New Appliances

John M. Bess, recently appointed executive vice president of the Noma appliance divisions, Noma Electric Corp., has announced that the Estate-Heatrola division will include, in its 1947 manufacturing and sales operations, a line of household refrigerators, home freezers, kitchen cabinets, stainless steel kitchen sinks, and electric and gas water heaters.

The 1947 line of gas ranges will be completely new, according to Bess, and the Estate-Heatrola space heaters will include gas Heatrolas, small gas heaters and gas floor furnaces.

Mississippi Board Order On Well Spacing Remanded

In a case heard in a Jackson, Miss., Circuit Court the Superior Oil Co. was awarded a judgment against the Mississippi Oil and Gas Board in an appeal for 640-acre spacing regulations for gas wells in the Gwinville field.

The court held that the 320-acre spacing order handed down by the Oil and Gas Board on August 28 was "arbitrary and capricious and not supported by substantial evidence" and the board order was disapproved and remanded.

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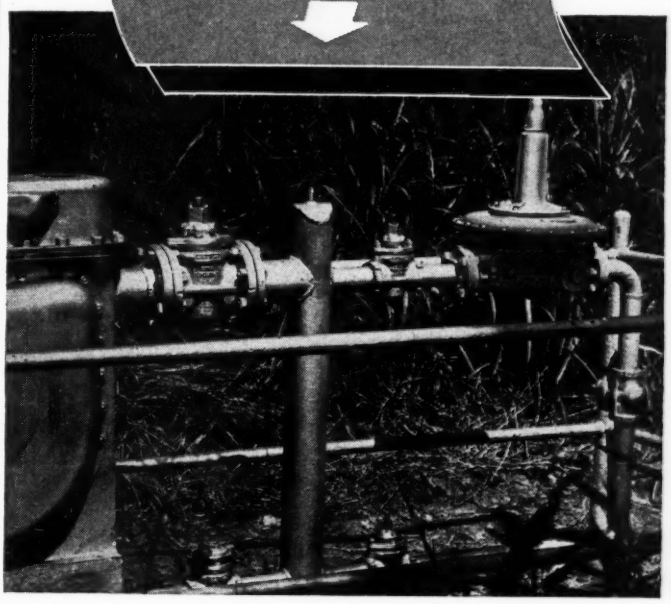

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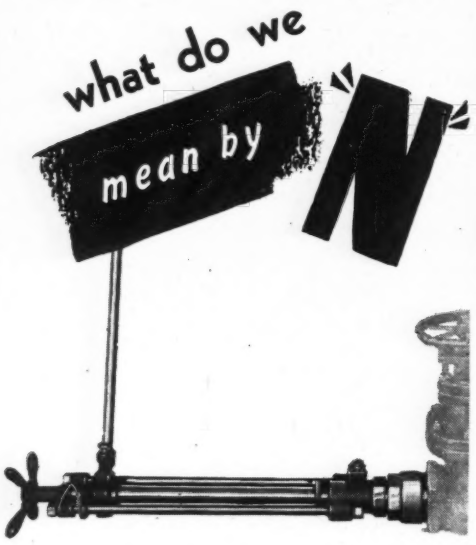

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Portland Gas & Coke Co. Triples Construction Budget

E. L. Hall, vice president and chief engineer of Portland Gas & Coke Co., Portland, Ore., has stated that the firm's 1946 construction budget was raised from $500,000 to $1,500,000. The need for this increase was due to service needs of new residential developments and an over-all demand for more gas, according to Hall.

New construction includes three compressor stations, one enlarged compressor station, and more than three miles of new high pressure mains.

Texas Co. Announces Modernization Plans

The Texas Co. has announced plans for modernization and expansion of its West Tulsa, Okla., refinery at an estimated cost of more than $2 million.

Plans include a new crude pipe still of approximately 30,000 gals. a day capacity, to replace the present shell stilling equipment; construction of fluid catalytic cracking and recovery equipment; a polymerization unit; an acid treating and sweetening plant; additional steam generating and distribution equipment and other auxiliary units.

Peerless Corp. Purchased By G. L. Ohrstrom Co.

The capital stock of the Peerless Manufacturing Corp., Louisville, Ky., has been purchased by G. L. Ohrstrom & Co., 40 Wall St., New York City. The purchase was made for investment purposes only, and there will be no change in the management or policies. G. L. Ohrstrom, H. T. Cavanaugh and Merrill Stubbs, partners of the Ohrstrom firm, were elected to the Peerless board of directors.

Gas Service Curtailed

The Savannah Gas Co. last month warned that needless use of gas must be avoided if adequate service was to be continued during the coal strike. Charles B. Gamble, president of Birmingham Gas Co., notified industrial plants employing more than 14,000 people that their supply would be cut off to enable the company to meet increased domestic demands. Gamble said the action was necessary to preserve the supply for heating and cooking purposes.

Panhandle Rates Suspended

Proposed rate schedules, which would not specify the volume of gas to be delivered to Central Indiana Gas Co. by Panhandle Eastern Pipe Line Co., were suspended recently by FPC. Under its existing contract, Panhandle is obligated to deliver all of Central Indiana's firm requirements, with a reasonable notice for increased deliveries. Another hearing will be scheduled on the matter.

Rockwell Buys Ohmer Corp.

Rockwell Manufacturing Co., Pittsburgh, Pa., has acquired the Ohmer Corp. of Dayton, Ohio, manufacturer of taximeters, fare registers for street cars and buses, and cash registers. This purchase brings the total of Rockwell-owned subsidiaries and divisions to 12.

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CURRENT READING

The following papers were presented at the 26th Annual Meeting of the American Petroleum Institute at the Stevens Hotel, Chicago, Nov. 12, 1946.

The Use of Plugging Agents—Harvey T. Kennedy. This paper discusses recent developments in the use of plugging agents in secondary-recovery operations. These include the use of various finely powdered solids—such as cement, colloidal clays, and wax distillate—which are added to the water at the input well in water flooding. The use of smokes of various compositions, as applied to gas- or air-repressuring projects, is also discussed.

The plugging of water, which bypasses oil in fields which are not being artifically flooded or repressured, conserves propulsive energy, and allows commercial production of oil that could not otherwise be obtained. It may, therefore, be considered as a method of secondary recovery itself, comparable in importance with repressuring or water flooding.

Gas-Condensate Reservoirs—A Review—O. F. Thornton. Ten years of operation of gas-condensate reservoirs has verified the necessity for and practicability of cooperative and unitized operation. Three types of gas condensates now are recognized: wet-gas; retrograde-gas; and reservoir-liquid. The operating method for each reservoir should be based upon the characteristics of the gas condensate at reservoir conditions. Other factors such as richness of the gas, size of the reserve, capacities of wells, nature of the reservoir, and mode of occurrence of the gas condensate must be considered. Marketing conditions, tax position, and other factors also are important. Due to the increasing volume of the gas market, and prospects for chemical conversion of gas to liquid fuel by the Fischer-Tropsch process, many operators will be required to make a choice or compromise between complete pressure maintenance and gas sales. This can be done intelligently with known methods of evaluation.

Miscellaneous Fractionating Techniques—J. J. Cicalese, J. A. Davies, P. J. Harrington, G. S. Houghland, A. J. L. Hutchinson, and T. J. Walsh. The fractionation of hydrocarbon mixtures in standard bubble-cap plate towers is discussed in a manner designed to emphasize the capacity and efficiency factors for existing equipment. A brief theoretical discussion is followed by sections on operating procedure, instrumentation, changes outside towers, and changes inside towers, to familiarize operators with certain techniques used by the authors to improve the performance of fractionators.

An engineering investigation of a specific tower, covering the development of improved performance, is appended as an illustration of the application of parts of the text of the paper. The authors collaborated during the recent war to prepare the paper so that units of the industry might better be able to maximize war-products outputs.

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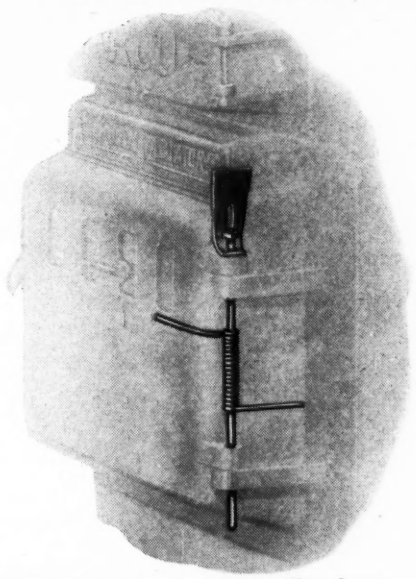

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Naptha Polyforming With Outside Gas—W. C. Offutt, P. Ostergaard, M. C. Fogle, and H. Beuther. The Polyform process is an attractive means of simultaneously converting low-octane napthas and renegade refinery gases, both paraffins and olefins, to high yields of gasoline having ASTM octane ratings of 75 to 80 and research octane ratings of 84 to 93, without the addition of tetraethyl lead. Comprehensive studies of naptha Polyform operations charging outside refinery-gas streams are presented herein for the first time.

The effects of varying amounts and compositions of outside-gas charge are discussed with respect to yields and quality of products obtained with a wide range of naptha charge stocks. The flexibility and simplicity of the process are emphasized, especially for manipulating seasonal refinery butane balances. A maximum yield of highly unsaturated butane-butene can be recovered from naptha polyforming with or without outside gas, or excess refinery butane-butene can be charged to the Polyform unit for maximum production of high-quality motor fuel. Extent of conversion of the outside-gas streams can be varied widely for optimum utilization of the available charge in the polyforming equipment.

A Review of Five Years of Operation at the Langlie Unitized Repressuring Project—Ralph L. Gray. The results of five years of operation under a gas-injection program are summarized. The project, known as the Langlie Unitized Repressuring Project, is located in southeastern New Mexico. The project was started when the average reservoir pressure was 615 psi (original pressure was estimated at 1400 psi). After five years of injecting gas into two wells, the average pressure had declined to 467 psi in the 13 wells. The average gas-oil ratio at start of injection was 2000 cu. ft. per bbl., and is now about 11,000 cu. ft. per bbl. The greatest operating problem, the channeling of gas, has been solved to a certain extent by controlling injection of gas by packers. It is estimated that recovery by gas injection ultimately will be 43.5% greater than primary operation for injection period or 14.8% greater for entire life.

Distribution Systems and Surface Injection Equipment in Secondary Recovery—C. H. Keplinger. Consideration has been given to distribution systems and well-injection equipment for secondary recovery of oil by air, gas, and water. Economical distribution systems may be designed on a sound engineering basis if the important factors such as volumes, pressures, and expected life of proposed projects are accurately estimated. Standard surface well-injection equipment may be varied to meet local conditions. Individual well meter equipment should be provided for every project.

Separators and Tanks—W. L. McCloy, Jr. Consideration has been given to methods and equipment used in the delivery of oil from the well as "well fluid" through the various stages of separation to the stock tanks as "pipe line oil." Separators are discussed in connection with gas-oil separation, and also in the sense that oil must be separated from water and emulsions. Various methods and equipment hook-ups for treating emulsions are set forth

diagrammatically, and in the body of the paper. Tanks are treated generally as to the adaptability of various types and sizes to different circumstances.

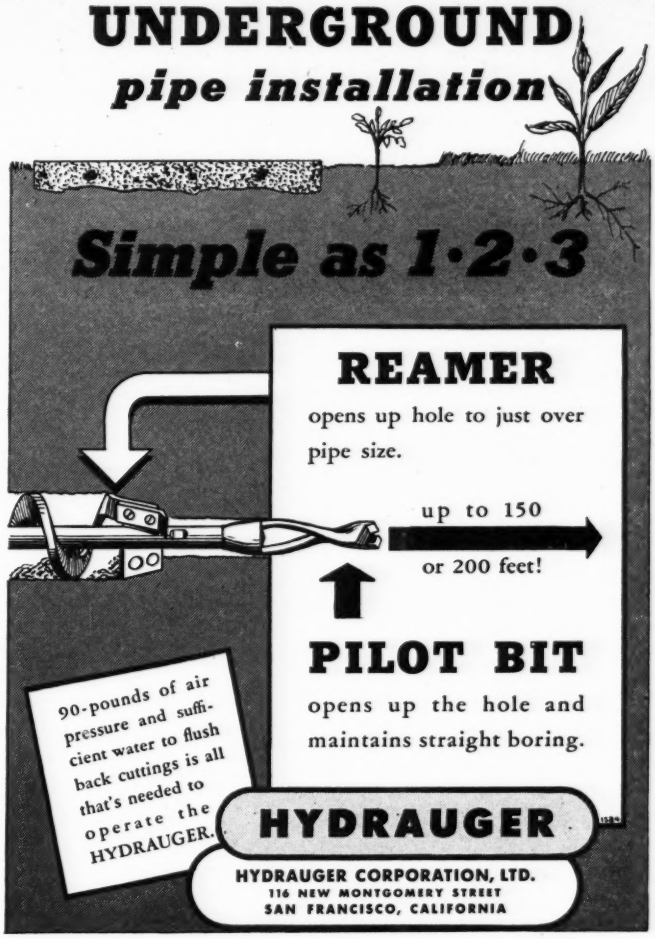
Because the entire subject is innately controversial, it has been covered very generally, avoiding definite conclusions but presenting various practices that are in general use. The discussion is one of practical nature, avoiding the highly technical aspects of the subject.

Corrosion and Preventive Methods in the Katy Field—R. C. Buchan. The author describes briefly the Katy gas-condensate field, the producing and cycling equipment used, and its operation. The effects of acidic-water corrosion are illustrated and discussed. The use of plastic-coated pipe, and the use of soda ash as a neutralizing agent, are described as being practical means of reducing corrosion losses in the Katy Field. The need for continued research and for field testing of alloys is pointed out. Instead of waiting for a complete understanding of such problems, it is advocated that full-scale field tests be initiated as soon as corrosion is found in new fields. The arrangement of subsurface equipment to facilitate corrosion control is discussed briefly. The importance of keeping equipment in safe working condition is emphasized.

Factors Influencing the Leakage Resistance of Threaded Pipe Joints—E. N. Kemler. This paper summarizes an extensive experimental program made to evaluate the relative effects of various factors on the resistance of threaded joints to leakage under gas pressure. The tests showed that, within the limits of the experimental program, the tolerance on the thread elements had no influence on the leakage resistance. Of most importance in leakage resistance are: (1) makeup; and (2) thread lubricant. These tests indicate further studies should be given to both lubricant and makeup in order to improve the leak resistance of such joints.

Laboratory Distilling Columns of High Efficiency Used in the Work of the API Research Project No. 6—Charles B. Willingham and Frederick D. Rossini. This report presents a review of the assembly, testing, and operation of the laboratory distilling columns of high efficiency used in the work of the API Research Project No. 6 on the analysis of the gasoline and kerosene fractions of petroleum, alkylates, hydrocodimers, codimers, and naphthas, and in the purification of API-Standard and API-NBS hydrocarbons.

Dividends from Furnace Draft—R. Reed. "Oil and Gas Journal," Sept. 14, 1946, pp. 80, 82, 83. Neglect of furnace draft and the details of furnace and burner operating details result in high furnace-maintenance cost, fuel waste, danger of personnel injuries, and damage to process conditions. Accurate draft indication is difficult to obtain in areas of high winds. This article shows in detail how a representative average furnace pressure indication may be had at all times when high winds prevail. Reduction of excess air is necessary to obtain the best operating results; pressure on furnace arch results in damage and less efficient operation.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Catalogs

• **Leslie Co., 92 Delafield Ave., Lyndhurst, N. J.**—Bulletin 461 contains 20 pages completely illustrated in color, giving engineering, operating and maintenance data on pressure reducing valves, differential valves and overflow valves for steam air or gas services. Cross-sectional and external views of each class of regulator are shown, with construction details, exclusive features and complete tables of pressure ranges, sizes and capacities.

• **The Foxboro Co., Foxboro, Mass.**—Bulletin 277-1 entitled "Pneumatic Control Valves and Controller Accessories" is a 36-page revised and expanded edition of the company's valve bulletin. Copies will be mailed upon request to the firm.

• **Republic Boiler Corp., 30 Church St., New York 7, N. Y.**—This four-page color bulletin describes Republic's tubeless residential steel heating boiler. The boiler is constructed with flue ways, and the manufacturer claims that there are no tubes to corrode, burn out or leak. Self-cleaning thermalizer guarantees long flue travel. Low water lines eliminate the expense of pits, special piping or other mechanical device. Special prefabricated, heat-resisting combustion chamber is available. An enameled steel jacket covers the exterior and 1½ in. of rock wool between wire mesh provides an insulating blanket over the entire boiler.

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SEND FOR BULLETIN No. 114

• **Surface Combustion Corp., Toledo 1, Ohio.**—A four-page bulletin, No. SC-132, describes "Surface" Prepared Atmospheres Roller Hearth furnaces for ferrous and non-ferrous bars, tube and strip. Elimination of air infiltration, accuracy of roller alignment under varying temperatures, and the high rate of heat input which makes it possible to reduce the number of tubes ordinarily required, are described. The most practical and economical means of minimizing decarburization and preventing scale in continuous furnaces is emphasized. Furnace operating data are included.

• **The M. W. Kellogg Co., Jersey City, N. J. and New York, N. Y.**—"Fluid Progress" is a 16-page color brochure tracing the process of oil refining from its improvement during the war to its present state. Special attention centers on the application of the fluid process to small units, and the brochure points out that the method is now economically applicable to all sizes of installations. A two-page full-color diagram of the process showing all major design improvements to date, as well as a number of tables and photographs, accompany the text.

• **Fischer & Porter Co., Dept. 4E-7, Hatboro, Pa.**—Bulletin 40-A describes completely armored variable-area flow rate meters, designed for use where high pressures, high temperatures, possibility of liquid hammer or handling of hazardous gases or liquids makes the use of rotameters with exposed glass tubes dangerous and impractical. This instrument may be obtained as a standard flow-rate indicating meter or as a recording or recording-controlling or totalizing meter with readings at the meter or at a remote location.

• **Roots - Connersville Blower Corp., Connersville, Ind.**—Bulletin 120-B-13 is an 8-page, two-color folder stressing the wide range of applications which R-C Centrifugal blowers may be used. It is claimed that these units are equally effective as boosters or as exhausters, and an instance is cited where gas at 1000° F. has been circulated at 100 lbs. pressure. The bulletin is available from the company or any sales office of the firm.

• **The Moore Co., 544 Westport Road, Kansas City 2, Mo.**—Moore direct drive axial-flow pressure blowers are described in a 12-page bulletin illustrated with photographs, line drawings and tables. These corrosion-resistant blowers are produced in two basic groups—the "Series 16" indicating a 16-in. hub and the "Series 24" with 24-in. hub. A complete price list accompanies the bulletin.

• **W. M. Chace Co., 1636 Beard Ave., Detroit 9, Mich.**—"Thermostatic Bimetals and Special Alloys" is a four-page folder describing actuating elements for temperature responsive devices. Write to the company for catalog discussing 35 types of Chace thermostatic bimetal.